APPROACHES TO AN UNDERSTANDING OF APHASIA: NEUROLINGUISTIC STUDIES IN THE BRITISH ISLES, 1793 - 1894

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ABSTRACT

This thesis is the first detailed investigation to be undertaken into the linguistic and neurological aspects of aphasia as revealed in the literatures of medicine, psychology and linguistics published in the British Isles between 1793 and 1894. During this period almost 600 case-reports or discussions of aphasia were contributed by over 300 clinicians. Much of the work was limited in scope and often lacked intellectual substance. Some of it, however, contained thoughtful and original views, especially that by Abercrombie, Bristowe, Broadbent, Dunn, Hughlings Jackson, Maudsley and Osborne.

The material in the case-reports and discussions is considered against the contemporary background of ideas about language in the fields of linguistics, psychology and medicine. Particular emphasis is placed on examining the theoretical frameworks that were devised or, simply, adopted by clinicians for understanding aphasia. It is concluded that the inability of linguists at that time to develop a relatively integrated and appropriate theory of synchronic language study, preoccupied as they were with, in the main, questions concerning the origin of language, comparative philology and philosophical grammar, did not aid clinicians in their attempts to unravel the apparent complexities of aphasia. On the other hand, the interest that was shown by clinicians in devising models of language processing indicated that, in certain respects, one of the

key features of a theory of language breakdown in aphasia was being tackled.

The years 1793 to 1894 are divided into two main periods of study. In the first (1793 to 1862), there was abundant evidence that clinicians were aware of a variety of aphasic symptoms, involving not only a disturbance of speech, but of other modalities also, such as writing, speech-comprehension, reading and gesture. Views were expressed on the localization of language, many of which anticipated the opinions put forward by clinicians later in the century.

From 1864 onwards, the subject of aphasia became a major research interest of certain clinicians. One of these was Hughlings Jackson, and his views are considered in their entirety. The dominant influence on British aphasiological studies, especially in the 1860s and 1870s, was not Jackson, however, but Broca; or rather, a distorted interpretation, in general, of the views Broca expounded on the role of the left inferior frontal gyrus in cases of aphemia, not of aphasia. To clarify the nature of Broca's influence, a detailed account of his views on language localization is included.

It is shown that the traditionally received opinion that 'damage in the left inferior frontal gyrus causes aphasia' is a highly superficial evaluation of the evidence that was presented in 19th century British studies.

Other topics that are dealt with in the thesis include the emergence in clinical thinking of a second neurogenic language disorder, dysarthria, the classification of varieties of aphasia, and the methods that were devised for the assessment and treatment of aphasia.

'The inability to speak is owing sometimes not to the paralytic state of the organs of speech only, but to the utter loss of the knowledge of language and letters.'

W. Heberden 1806:348.

'Was für eine Vorstellung kann man sich davon machen wenn es heisst: „das Sprachcentrum liegt in der dritten linken Stirnwindung?" Ich meine, nur eine sehr vage, fast so vage wenn es hiesse: „das Centrum der Dampfmaschine."

C. Spamer 1876:506.

'It is not that most neurobiologists do not have some general concept of what is going on. The trouble is that the concept is not precisely formulated. Touch it and it crumbles.'

F.H.C. Crick 1979:133.

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NOTE ON ABBREVIATIONS

In addition to standard abbreviations (e.g. BMA for British Medical Association), the following are used:

DNBc : The Compact Edition of the Dictionary of National Biography (1975)

MTG : Medical Times & Gazette

OEDc : The Compact Edition of the Oxford English Dictionary (1971)

INTRODUCTION

NOTES TO THE INTRODUCTION ARE BETWEEN
PAGES 53 AND 57

0.1 Résumé

This Introduction is, of necessity, somewhat lengthy. In it I consider: (a) the aims of the thesis, (b) the reasons for choosing the period 1793-1894 for study, (c) the contents of the individual Chapters, (d) the extent of the literature on aphasia, (e) previous studies which have touched in part on the subject-matter of the thesis, (f) certain theoretical and terminological preliminaries to the study of 19th century neurolinguistics and (g) the potential that existed amongst certain members of the medical and linguistic professions in the 19th century for the pursuit of neurolinguistic studies.

0.2 Aims of the thesis

The general aim of this thesis is to describe the development of the study of "aphasia" (the use of " " is explained below, 0.7.3) in the British Isles between 1793 and 1894 as revealed by the numerous case-reports and discussions that were published, mainly in the medical literature. The more specific aim is to examine the ways in which attempts were made to understand the nature of aphasia from the standpoint of contemporary thinking about language in the fields of medicine, linguistics and psychology. In short: to consider the extent to which clinicians working with aphasics felt able to explain their patients' communication problems within the bounds of current pre-conceptions about language. Such an aim will involve, then, the consideration of the intellectual bases to concepts such as 'faculty of language' and 'power of speech'.

Much has been spoken and written, both in the present century and the last, about the apparent complexities which surround the subject

of aphasia. A careful examination of the theoretical frameworks that were used by 19th century clinicians to try to unravel these complexities shows that much of what was considered to be problematical can be traced to the limited nature of the theory of language employed in the clinical analyses. Thus, to define aphasia as merely, for example, a 'disturbance of language resulting from cerebral dysfunction' without any elaboration of what the word 'language' implies, is, quite obviously, to raise a further problem. It will be my contention that the rock on which many proposals for an understanding of "aphasia" foundered was precisely the limitations of the linguistic point of view that clinicians adopted.

0.3 Contents of the individual Chapters

In Chapter 1, I consider the background to the study of language in the British Isles during the latter part of the 18th and throughout the 19th centuries, putting particular emphasis on the way in which the word 'language' was used. This provides the intellectual background to the concept of language which clinicians may have been using. As will be made clear, however, in the present state of knowledge of the actual attitudes adopted by clinicians to language, one cannot be certain that ideas about language deriving from the work of linguists and psychologists directly affected the thinking and clinical procedures of those who worked with "aphasic" patients.

Chapter 2 is concerned with the gradual unfolding of neuro-linguistic studies in the British Isles from 1793 to 1862. Information is presented on the state of studies in different parts of the British Isles, and on the hypotheses that were developed to try to explain the wide variety of "aphasic" symptoms.

The 1860s marked the beginnings of a major and concerted effort by clinicians to come to grips with "aphasia". The major theme of much of the work, especially from 1864 to the end of the decade, was the view put forward in France by Paul Broca that a particular aspect of speech production was localized in the left inferior frontal gyrus. To understand fully the various positions that were adopted by British clinicians to Broca's views, it is crucial to appreciate exactly what Broca meant by his various utterances on the correlation of 'la faculté du langage articulé' and the left frontal lobe. For this reason, Chapter 3 is devoted entirely to a detailed examination of his views.

In Chapter 4, which traces the huge degree of interest shown by British clinicians in "aphasia" between 1864 and 1894 (nothing was published on the subject in 1863), particular attention will be paid to the theoretical approaches adopted by clinicians in their attempts to understand the condition.

Chapter 5, is, like Chapter 3, concerned solely with the work of one clinician, Hughlings Jackson. It will be shown that he, amongst a handful of clinicians who wrote in some detail and with some originality on the subject of "aphasia", was the only one who reached the point in his clinical investigations when he could rightly claim that his personal approach, that is his neurolinguistic theory, provided the key to a genuine understanding of "aphasia". At the same time, I shall indicate that there are grounds for concluding that even Jackson himself was unsure about particular features in his theory and that it can, in certain respects, be justifiably criticised.

Following Chapter 6 (Conclusions), the three Appendices deal, respectively, with the chronological development of "aphasia" studies between 1793 and 1894, with Broca's studies of linguistics, and, lastly, with both the methods of assessment used by clinicians in their analysis of "aphasic" symptoms and the forms of treatment that were proposed, especially the idea of speech therapy for "aphasics". In this last Appendix, the material covered extends chronologically to 1911.

0.4 The period covered

The 130 years between 1786 and 1916 marked an important period in the history of linguistics. In 1786, Sir William Jones put forward his hypothesis on the possible historical connections between certain of the world's languages, and John Horne Tooke published the first volume of his Diversions of Purley. Both events were, in due course, to become foci of attention within linguistic studies in the British Isles, and to lay the foundations for particular approaches to the study of language in the 19th century. At the other end of the period, in 1916, the publication (in Europe) of Saussure's Cours de linguistique générale signalled the beginnings of what has generally been described as 'modern, structural linguistics'.

In the field of neurolinguistics, however, there is no date in the 18th century comparable in importance to 1786 in linguistics. The study of neurologically-based language disorders - or at least the conscious awareness of such disorders - had begun much earlier. In the 18th century itself, a number of cases of what may have been aphasia were reported. For example, in 1752 a case of 'speechlessness'

was said to have been cured by the use of electricity.(1) A few years later, a case was published of a woman who 'became all at once deprived of her reason' and who 'talked incoherently'.(2) An indisputable case of aphasia, however, was described in 1767 by the London physician, Matthew Maty. It concerned a Frenchman, Count Lordat, who, following an injury, was reduced to the point at which 'What words he still could utter were monosyllables, and these came out, after much struggle, in a violent expiration, and with such a loss of voice and indistinct articulation, as hardly to be understood but by those, who were constantly with him'.(3) Such published accounts of aphasia - if indeed they were always that - never established a pattern of interest in the subject amongst the medical profession. This was only to emerge during the 19th century itself, particularly from the 1860s onwards.

For this reason, 1793 has been chosen more or less arbitrarily as the starting-point for this study. That year, the Irish surgeon and antiquary, Sylvester O'Halloran, published his New Treatise on the Different Disorders Arising from External Injuries of the Head, a work which included brief descriptions of two cases of speech disturbance that he had had occasion to witness. On the other hand, 1793 may be regarded as being of some importance in neurolinguistic studies, for it was then that Franz Gall began his studies of the functions of the brain. These led, in due course, to the concept of phrenology, a subject which impinged on the study of aphasia.

The choice of 1894 as the finishing-point has, however, been dictated by a factor specific to the state of neurolinguistics in the

British Isles. It was in the first half of the 1890s that a distinct period in British neurolinguistic studies drew to a natural close. In 1891, John Wyllie of Edinburgh began publishing a series of papers on the subject of 'disorders of speech'; their publication was completed by May 1894.(4) Shortly afterwards they were reprinted, with some additional material, as a book entitled The Disorders of Speech.(5) This was the first comprehensive text on speech pathology to appear in the British Isles, and it was soon recognized as 'one of the most complete treatises on disorders of speech in any language'.(6) It was also, however, to be Wyllie's last word on the subject. In later years he produced studies of the cerebellum and of meningitis, but he never returned to the subject of speech pathology.

Further proof that an era had come to an end were the deaths, in 1892 and 1895, of James Ross, the author of one of the few 19th century British textbooks dealing specifically with aphasia, and of John Bristowe, a London clinician who had made important contributions to the study of the subject, not least in his use of phonetic principles in both the analysis and remediation of aphasic speech. But perhaps most important of all as an indicator of how a period in aphasiology had come to a close was the fact that John Hughlings Jackson produced his last paper on aphasia in 1893, although he continued to write on other medical and psychological topics right up until his death in 1911.

Looking at developments in linguistics and psychology during the first few years of the 1890s, one notes that a different climate of opinion was beginning to develop. In 1892, Sweet published his New English Grammar, a work which helped to establish the concept of

synchronic linguistics as well as to put invigorated emphasis on grammar as a worthy subject of linguistic scrutiny. The following year at Cambridge, W.H.R. Rivers was appointed to the University's first lectureship in the physiology of the special senses (that is, of experimental psychology).

From these facts, then, one may say that the 1890s acted as a sort of dividing-line in neurolinguistic work: when older studies came to fruition and when newer, different horizons began to open up for the subject, especially in the field of experimental psychology. The chronological limits of this thesis are, then, the work of O'Halloran and of Wyllie.

The restriction of the thesis to the work carried out and/or published in the British Isles may smack of chauvinism: the implication being that doctors were immune to ideas about "aphasia" that were developing in other parts of the world, particularly in Europe and in the United States. However, it would seem reasonable to assume that the English-speaking medical profession would have turned far more readily to the British medical journals, such as the British Medical Journal and the Lancet and to works published in the British Isles for enlightenment on the subject than they would have done to comparable publications abroad. The question of the availability in the British Isles of American medical journals and books, which carried reports of "aphasic" cases, has not been examined. It may be that such items were as readily available to a British reader as to his foreign counterpart; precise information on this point is, however, lacking. Hence, unless American (and indeed other foreign) work was published

in the British Isles, it has not been taken into account in assessing the pattern of aphasiological studies. Only exceptionally, in the case of Joseph Fayrer whose connection with the British medical world is attested to by other works, has this principle been overlooked. In a sense, then, the focus of attention can be described as the developing pattern of aphasiological studies as perceived by the monolingual British doctor. For purposes of exemplification of particular (and especially theoretical) points, however, it will be necessary to consider the work of foreign doctors, but only in so far as it had a definable effect on the views of members of the British medical profession. Thus, space has been devoted to a close examination of the opinions of Bouillaud and Broca in order to assess the interpretations put upon their work by British doctors.

0.5 Extent of the literature on aphasia

0.5.1 Published literature

Towards the end of the 19th century, Pershing, reflecting on the number of publications dealing with the entire field of speech disorders in the 19th century, remarked that it had 'reached such an enormous volume'.(7) Bastian, restricting himself to only the literature on aphasia, was to describe it identically, as being 'enormous'.(8) A good, but not totally accurate, measure of the sheer amount of work that was published is the number of items listed under the heading of APHASIA in the first and second series of Billings' Surgeon-General's Index-Catalogue.(9) Taking into consideration only those works published between 1793 and 1894, and bearing in mind that Billings was selective in what he included in the Index-Catalogue,(10) the total

number of items, excluding from the calculation the numerous reprints and, in certain cases, translations of particular items, is 974. This figure represents material on aphasia published throughout the world and noted by Billings. An analysis of the figure country by country shows that the bulk of the literature was published in France, the British Isles, Germany and the United States: see Figure 1.(11) It should be emphasized in any case that the figure takes no account of the quantity (as measured in pages of print) nor, of course, of the quality of the individual items. Furthermore, it has been assumed that a work emanating from a particular country was by a national of that country, although in some cases this assumption may not be wholly justified. Thus, Bateman, an English doctor from Norwich, had two items published in France; these have been counted as French work alongside that of Broca, Charcot and others. In addition, the total of 974 rarely includes any of a substantial number of items on aphasia that were published in general works on medicine, psychology and linguistics: unless the word 'aphasia' appeared in the title, Billings may not have noted it. Thus, according to him, the total number of items on aphasia published in the British Isles is 179; but once the unlisted items are added, the total rises to 594. It is this latter that has been taken as the object of study in this thesis. The existence of case-reports and discussions of "aphasia" has been determined from Billings and from the indexes to the British medical journals that circulated during the period 1793 to 1894.

Despite the reservations expressed above about the accuracy of Billings' list, one sees it in tangible evidence not only of the sheer extent of the literature on aphasia up until 1894, but also of the

Figure 1

STATISTICAL SUMMARY OF WORKS ON "APHASIA", PUBLISHED BETWEEN 1793 AND 1894 AND LISTED IN BILLINGS (1880-1895, 1896-1916)

	No. of Items	% of Total
Australia	2	0.205
Austria	36	3.696
Belgium	12	1.232
Brazil	4	0.410
Britsh Isles	179	18.377
Canada	6	0.616
Chile	1	0.102
China	1	0.102
Czechoslovakia	5	0.513
Denmark	5	0.513
Finland	2	0.205
France	287	29.466
Germany (F.R.G. and G.D.R.)	153	15.708
Greece	2	0.205
Hungary	3	0.308
India	11	1.129
Italy	62	6.365
Japan	2	0.205
Mexico	1	0.102
Netherlands	8	0.821
Norway	4	0.410
Peru	1	0.102
Poland	10	1.026
Rumania	1	0.102
Soviet Union	10	1.026
Spain	12	1.232
Sweden	5	0.513
Switzerland	5	0.513

/...

Figure 1 (Contd.)

	No. of Items	% of Total
Turkey	1	0.102
United States of America	140	14.373
[No country of publication indicated]	3	0.308
Total	974	

international character of the research. By 1894 - and, indeed, well before that date - aphasia had become a subject of study by, mainly, doctors throughout most of the world, but especially in parts of Europe and in certain of the English-speaking countries.(12)

0.5.2 The unpublished literature

The material examined has been restricted almost entirely to the published literature of the period 1793 to 1894; some of John Abercrombie's unpublished work has, however, been considered.(13) The main reason is that to date there has been little collation and even less dissemination of information regarding the contents of any unpublished source-materials on aphasia, in either the Nachlässe of medical men, linguists and psychologists, or the preserved working-files of hospitals.(14) The difficulty is that until such time as a thorough search is made of the extant holdings of unpublished material in hospital archives and so on, there is no guarantee that, for example, a handful of letters from one doctor to another in which "aphasia" is mentioned is representative of the individuals' interests in the subject. Indeed, much preliminary work remains to be done before any unpublished material on aphasia and other linguistic pathologies can be incorporated into an account of neurolinguistics in the British Isles in the 19th century.

0.6 Previous studies of the subject-matter of this thesis

Certain aspects of the subject-matter of this thesis have been touched upon, albeit briefly, in other works. With the exception of commentaries on Hughlings Jackson (see below) the references are usually little more than bibliographical. More attention has been

paid to figures from the major period (1864-1894) than from the earlier period, such as Jackson, Broadbent, Bastian, Banks, Moxon and J.W. Ogle.(15) Even so, this list is far from complete, and omits any mention of other doctors whose work can be considered to have been of significance: for example, Bristowe, Ross, Alexander Robertson and Gairdner. For the earlier period (1793-1862) there are sporadic comments on, for example, Crichton, Heberden, Osborne, Hood, Abercrombie and Browne.(16)

The work in neurology of Hughlings Jackson has been studied on a number of occasions,(17) but there has been no evaluation of his entire published output on aphasia between 1864 and 1893. Greenblatt, for example, has looked in detail only at the work that appeared up until 1866.(18)

The period from 1793 to 1894 in British aphasiological studies has been covered only in part by Head. In fact, he implies that prior to the work of Jackson no attempts were made, in England at least, to understand the nature of aphasia: 'Interest in the association of cerebral lesions with disorders of speech rapidly spread in England [after the publication of Broca's papers in the early 1860s] and in 1864, Hughlings Jackson made his first contribution to the subject'.(19) Such an assumption is, as will be shown, quite erroneous.

The only work to come close to the subject of this thesis is a paper by Marx.(20) In it he discusses, in inevitably general terms, the state of linguistics and of aphasiological studies in the 19th century. He shows that little connection between the two can be found, except in the work of the German linguist, Herman Steinthal. He

mentions the work of a number of British nationals, including Jackson, Max Müller, Bastian and Broadbent, but much of the paper is given over to a description of the ideas on aphasia of Continental workers such as Wernicke, Kussmaul, Broca and Freud. Nevertheless, his statement that 19th century aphasia studies 'very seldom contained an investigation of the basic theoretical questions related to language or a definition of language capacity'[21] is a conclusion that I too reach, but only on the basis of a detailed examination of the British aphasiological literature.

0.7 Terminological and theoretical questions

0.7.1 Anatomical nomenclature

In order to achieve consistency in the use of neuroanatomical terminology, I have followed as far as possible only the usage given by Romanes in his revision of Cunningham's Manual of Practical Anatomy.[22] Thus, whereas almost all of the 19th century case-reports refer either to the 'inferior frontal convolution' or to the 'third frontal convolution', I have replaced both terms in discussion (but not when quoting from the case-reports themselves) by 'inferior frontal gyrus'. Similarly, the almost ubiquitous 'island of Reil' and 'optic thalamus' have become the 'insula' and the 'thalamus' respectively.

0.7.2 Speech pathology

The term 'speech pathology' has been retained on the grounds that it is generally (perhaps even universally) accepted amongst speech therapists and psycholinguists as the cover-term for disorders of not only the expressive modalities of speaking and writing, but

also of the receptive modalities of speech-comprehension and reading. Recently suggested alternatives are 'language pathology' or, slightly less specifically, ' linguistic pathology'; but these too can be criticized. Perhaps the least ambiguous term of all would be 'semiotic pathology'. But for reasons of tradition and practicality, 'speech pathology' has been used.

0.7.3 The term "aphasia"

Despite the extensive neurolinguistic literature that has been built up since the 19th century, no writer on the subject has apparently claimed to have put forward a definition of the word 'aphasia' that is at the same time intelligible, concise and comprehensive. In the opinion of Weisenburg and McBride '... aphasia cannot be accurately defined'.(23) In 1948, Goldstein used it in a broad sense to refer to 'speech disturbances' arising from 'lesions in the brain cortex'.(24) More recently, in 1979, Kertesz has specified its main feature as being 'a neurologically central disturbance of language', but has then, in order to make that definition meaningful, been compelled to list those particular aspects of 'language' which may be affected: word-finding, speech-comprehension, reading, writing, the motor performance of speech, and gesture, as well as certain non-verbal forms of behaviour such as constructional abilities and problem-solving.(25)

The problems of definition arise partly from the difficulty in encapsulating in a neat and relatively terse fashion the characteristics of the variegated forms of communicative impairment that may be encountered in aphasia, and partly from the apparently easy suitability of the word 'language' for use in such a definition. To define aphasia

as a particular disorder of 'language' immediately calls into question the interpretation that is being put on the word 'language'. Compared with words such as 'cortex', 'nerve', 'blood' or 'visual functioning', the word 'language', in view of its history in English, lacks any single agreed meaning - the Oxford English Dictionary lists more than a dozen meanings for it. As far as the study of aphasia is concerned, the term 'disorder of language' would seem best to be used as an indicator of a particular range of possible disturbances (of speaking, understanding, reading, writing, and gesture) rather than as the precise cause of the actual disturbance in communicative abilities.

The distinction between aphasia and dysarthria is, as will be shown in Chapter 4, a relatively modern one, and by the end of the period under consideration (1894) there was no evidence to show that it was being scrupulously observed in the reporting of clinical cases. Instead, throughout the period between 1864 (when 'aphasia' first came into use) and 1894, the term 'aphasia' was used by some clinicians for what are now accepted to be two relatively distinct categories of impairment. Before 1864, however, no specific term existed, but the symptoms described in the case-reports indicate that aphasia or dysarthria was clearly the neurolinguistic condition. In these circumstances, the term "aphasia" has been used as an appropriate cover-term.

To indicate that the symptoms are being interpreted as those of aphasia or dysarthria when no such terminology is used in the reports themselves, the word aphasia has been set between double quotation marks - thus, "aphasia". When, however, especially in generalizations,

it is felt that the content of "aphasia" is actually aphasia (and not dysarthria), the quotation marks have been removed. Single quotation marks ('aphasia') indicate that the word is being quoted directly from the post-1864 case-reports and discussions. This convention of distinguishing visually between "aphasia", 'aphasia' and aphasia will, I hope, help to clarify the status of what is, by general agreement, a slippery term to handle. It should be emphasized, nevertheless, that the term "aphasia" is restricted to what today would be considered to be aphasia and/or dysarthria: it specifically excludes those other speech pathologies which may be considered to have a possible underlying neuropathology, such as stammering, cluttering and certain forms of deaf speech. In addition, whereas nowadays aphasia is usually regarded as being due to a cerebral lesion, "aphasia" is used for cases of linguistic disturbance (excluding stammering etc.) whose pathologies are, on the evidence of post-mortem examination, of either cerebral, cerebellar or brain-stem origin.

0.7.4 The terms "language" and "linguistic"

In the way that "aphasia" is used as a broad cover-term, so the words "language" and "linguistic" are employed similarly. "Language" is taken to refer either specifically to one or to all of the communicative modalities of speaking, understanding, writing, reading and gesture; "linguistic" is the adjectival form. In Chapters 1, 2 and 4, however, space is devoted to a consideration of the interpretations put on the word 'language' by 19th century scholars and clinicians. In these cases, then, 'language' is defined much more precisely. The expression 'semiotic modalities' is occasionally used as an alternative to '"linguistic" modalities'.

0.7.5 The use of the term 'linguistics' in reference to 19th century studies of language

The term 'linguistics' is often used today in the sense of the study of language based on a set of theoretical principles developed in the 20th century. Can there be any justification, then, for using it for the types of language-study carried out during the 19th century? By the same token, one might also ask whether a person who today analyses the earlier stages of a language using a Neogrammarian theory of sound-change can be deemed to be a linguist in the same way that another person, analysing the same set of data but from a generative point of view, would automatically be considered to be one. In answer, a critical factor is that, regardless of the theoretical persuasions of the two analysts, it is language (or an aspect thereof) that is being analysed. To restrict the term 'linguistics' to only 20th century approaches is tantamount to saying that all 20th century linguistic theories must be valid, whereas all others are invalid. Such a line of argument is manifestly absurd.

In the same way that a neurologist is considered to be able to study any human brain, not just the brains of a particular group of people, so it would seem reasonable to admit that a linguist should be considered a person who is potentially in a position to analyse all of the world's languages. Hence it would appear logical to judge 19th century language-study by the same criterion: was the approach one that could be used for the analysis of any language, or was it restricted to a smaller number of languages, or even a single language?

Certainly, since the 17th century when the question of universal grammar was first mooted, there have been scholars whose intention has been to devise a way of looking at language that would have universal applicability. (Equally, there have been phoneticians whose view of the scope of phonetics has transcended the limits of any one language or cluster of languages and who have attempted to construct a theory of general phonetics.) In the 19th century, the search for a universally applicable basis for language-study is exemplified in the work of a number of scholars: one thinks, in particular, of the Neogrammarians and, in this country, of Max Müller and Sayce.(26) To withhold from them the epithet of 'linguist' because they happened to come too early to benefit from the influence of Saussure's ideas is nonsensical.

But what does one do about the many other writers on language who appeared not to interest themselves in language as a global phenomenon, but to devote their time to describing the structures of different languages, using, what is more, a theory (i.e. traditional grammar) which, in certain respects, contains a number of flaws? The answer, I believe, is to say that in the same way as 20th century linguists whose theories enjoy a period of acceptance amongst their colleagues but which are later shown to contain defects, are still regarded as linguists, so these 19th century linguists should be granted the same status. Ultimately what one is arguing towards is the point of view that anyone who studies language, either in general terms or with a particular language in mind but using a notionally general linguistic theory, should be called a linguist. I believe

that in the light of the sometimes major theoretical shifts in the way in which language has been studied during the present century, 19th century students of language deserve just as much to be called linguists as their counterparts today. For these reasons, then, the term 'linguistics' will be used of the types of language-study current in the 19th century.

0.7.6 'Neurolinguistics' and 19th century studies of language

The terms 'neurolinguistics' and 'neurolinguistic' are used extensively throughout this thesis, yet they came into use only during the 1930s. What justification is there for considering the work of 19th century clinicians to be as much a contribution to neurolinguistic studies as those of their 20th century counterparts? To answer this, it is important first of all to appreciate that neurolinguistics is not simply the juxtaposition of concepts from neurology and linguistics. Despite its apparently bidisciplinary character, it is in fact multi-disciplinary.(27) Linguistics is only one of a number of different disciplines which claim to have language as an object of study (psychology and sociology are two others), although in the case of linguistics it is its only object of study. But whereas a linguist will undoubtedly claim that the focus of his attention is the structure of language, it is essential from the point of view of undertaking neurolinguistic work that the psychological mechanisms of language (both in the expressive and receptive domains) should be taken into account. For most (possibly all) linguists, the psychological aspects of language are considered to be matters for the psychologist, not the linguist. For this reason, then, the '-linguistics' element in the word 'neurolinguistics' has to be understood as implying more than the

word 'linguistics' does in isolation.

In the same way, therefore, that 'linguistics' can be applied to the study of language (as much in the 19th century as in the 20th), so 'neurolinguistics' can be seen as a perfectly legitimate description, specifically from the view-point of the 19th century, of the correlates of language (in the 19th century senses of the word) and the brain. An important difference, nevertheless, between 20th and 19th century work in neurolinguistics (quite apart from the interpretations given to the word 'language') is that in the 19th century the whole of neurolinguistic study was devoted to the analysis and explanation of pathological data. With technological and theoretical developments in the present century, neurolinguistics can claim to be as much concerned with the neurology of the communication systems of normal people as of those whose "language" is in some respect impaired.

0.8 Latent expertise in neurolinguistics in the 19th century

0.8.1 Introduction

As will become evident in the course of this thesis, a large number of British doctors took varying degrees of interest in the subject of "aphasia". However, there were others who, by virtue of their qualifications or proven abilities in the field of language-study, might well have made a considerable contribution to the subject, but who did not do so. Unless any views they put forward have so far remained unpublished, it does seem somewhat unusual that, despite their backgrounds, they never apparently paid any attention to language disorders, let alone to "aphasia" in particular: certainly, there is no hint of

such an interest in their published works. They deserve, therefore, to be included in an historical survey of neurolinguistics for purely negative reasons: as an example of latent expertise in the dual fields of medicine and linguistics which, as far as one knows, was never utilized.

The concept of the medical expert who was also knowledgeable about linguistic matters - if not quite about linguistics itself - has a long history in the intellectual and scientific life of the British Isles. As far back as the 15th century, one finds Thomas Linacre, remembered inter alia for being one of the supporters of the idea of establishing a College of Physicians in London, wrestling with the problems of the parts of speech, as, on his death-bed, he attempted to complete his book on English grammar.(28) And towards the end of the 18th century, Thomas Beddoes, whose small contributions to the study of aphasia will be considered later, discussed various Greek etymologies and the views of Burnett (Lord Monboddo) and Tooke on the parts of speech.(29) Another doctor, John Haslam, published a book on the nature of thought and 'its connexion with a conspicuous sentence'.(30) But perhaps the two most distinguished examples of doctors who made their mark in the area of language-study were Thomas Young and Mark Roget. Young was the first person to decipher the enchorial (demotic) text of the Rosetta Stone and to introduce the term 'Indo-European' into 19th century linguistics; he also wrote the article on 'language' for the 6th edition of the Encyclopaedia Britannica.(31) Roget became world-famous on account of his Thesaurus, a brilliant example of lexical classification in English.(32) It must be a matter for regret, however, that his abilities as a semanticist

were never apparently put to further use in the analysis of lexical changes in aphasia.

Three further examples of how an interest in linguistics and in medicine could be combined in the same person, were Marshall Hall, the neurologist, who published, albeit privately, a new method of declining and conjugating Greek nouns and verbs;(33) Thomas Key, who after graduating in Arts, took a medical degree and later went on to occupy, in succession, professorial chairs in mathematics, Latin, and comparative grammar;(34) and lastly, Richard Quain, the doctor who left the bulk of his large fortune to University College, London, to further the study of modern languages and science, but especially the study of English.(35)

Three other names have so far not been mentioned as their work in linguistics and medicine deserves to be examined more closely. They are: James Prichard, Robert Latham and Henry M rley.

0.8.2 Prichard

James Cowles Prichard (1786-1848) was a physician and ethnologist who took a particular interest in linguistics. Born just nine days after Sir William Jones made his famous speech in Calcutta on the genealogical relationship of certain languages, Prichard was to be the first person to provide the conclusive evidence that the Celtic languages were indeed, as Jones had surmised, part of the Indo-European group. Regarded by his contemporaries as a man 'of exceptional mental capacity'(36) and with a 'powerful memory, and a strong philosophical bias',(37) he has not so far merited a full-length critical study.(38)

In the field of anthropology his work is generally regarded as having done little more than prepare the way for 'scientific' anthropological work in England: as Stocking shows, this is too simple an assessment of his work.(39) His activities in the fields of medicine and linguistics deserve attention, especially in view of Latham's comment that it was Prichard who was the 'first [person to combine] the two [subjects of anatomy and philology]'.(40)

Prichard studied medicine at Bristol, London and Edinburgh; his M.D. thesis of 1808 from the latter University is on one of the central themes of 19th century anthropology, namely the enormous range of physical and social variability in mankind. He then went on to practise medicine in Bristol, and one of the fruits of his early years there was his Treatise on Diseases of the Nervous System (1822). In the 1830s, his published work showed a shift of interest towards questions of psychiatric illness, and his Treatise on Insanity (1835) is still regarded as a classic in the field. He did, however, maintain his interest in neurology, reporting to the British Association for the Advancement of Science in 1836, for example, on the minor surgical treatment he used in the cases requiring 'counter-irritation';(41) he also published on the subject of epilepsy and of hemiplegia.(42)

His linguistic studies derived in part from his natural aptitude for languages - as a boy he learnt Latin, French, Italian and Spanish, and he used the opportunity of living near the port of Bristol to meet and talk to foreign sailors. In manhood he mastered not only German but also Hebrew and Greek. The other impetus for linguistic studies came from anthropology. One sees throughout his anthropological work evidence of his interest in language and languages, often the more

exotic, non-Indo-European ones. In many of his publications, he argues strongly that linguistics should be regarded as an important ancillary science in anthropological studies, as one of the 'hand-maidens of ethnology'.(43) This is borne out by, for example, his Researches into the Physical History of Man (1813), which contain page after page of thumb-nail sketches - inevitably superficial by modern standards but to the intelligent layman of the day doubtless exciting - of salient points in various languages and language-groups.(44) And in a work first published in 1849, a year after his death, there is a short chapter written by him on the role of linguistics in anthropological studies.(45)

With hindsight, we can admire the sensible attitudes he adopted to carrying out field-work studies of hitherto unknown and unanalysed languages. He notes, for example, the need to transcribe the spoken material of the informants with the greatest care, although he gives no guidance as to how this should be done; nor does he mention phonetics. He further notes the need for the field-worker to take down what today would be called the 'core' vocabulary of a language: the words for members of the family, parts of the body, natural objects, and so on. In the brief section on grammatical analysis, he warns his would-be field-workers, in effect, to guard against automatically interpreting grammatical phenomena in the language under description in terms of the grammar of English. He points out, by way of an example, that what he calls 'auxiliary words' may not operate in the same way as in English.

However, it is for two linguistic publications that Prichard is now better known. His lengthy statement, argued in detail, for Celtic to be regarded as a branch of Indo-European[46] antedates the publication by Pictet (1837) that has generally been taken to be the original exposition of the proof of the relationship. In fact, one sees earlier than this, in his Researches into the Physical History of Man of 1813 the germs of the thesis, but a complete argumentation is lacking.[47]

The other work of Prichard's for consideration is his An Analysis of Egyptian Mythology (1819) which, although not completely cracking the 'code' of the Rosetta Stone, nevertheless pointed in the right direction, and should be seen as a significant contribution to the discussions that had gone on since the 6th century A.D. as to the interpretation of the hieroglyphs.

From the foregoing, it would seem that Prichard would have been ideally placed to make a contribution to neurolinguistic studies: with his medical (especially neurological and psychiatric) studies on the one hand, and his strong commitment to linguistics on the other. It is surprising, therefore, that he appears to have shown only a limited interest in the subject. In his Treatise on Insanity (1835) it is never mentioned. In his Treatise on Diseases of the Nervous System (1822) certain neurolinguistic cases are briefly touched upon, but they had already been reported elsewhere in the medical literature by other doctors.[48] The cases concerned bilinguals who, as a result of brain-damage, had lost one language but not the other. His own explanation was that they had suffered a 'loss of memory'. The second,

and only other, published example in which language disorders were mentioned was in an article published in 1830,[49] which discussed the case of a hemiplegic whose speech was 'very inarticulate'. Prichard described, however, not the linguistic symptoms, but the surgical procedure he had used for draining a cerebral abscess.

0.8.3 Latham

If Prichard's comparative lack of interest in language disorders, given his other interests, is surprising, then the case of Robert Latham is even more so: a professor of English, a noted comparative philologist, and a physician with ten or more years experience of working in two large London hospitals, yet still no evidence of an interest in neurolinguistics! Robert Gordon Latham (1812-1888) has received a certain amount of attention, especially from linguists.[50] At the time of his death, more than 30 years after he had given up the practice of medicine, both the British Medical Journal and the Lancet saw fit to honour his memory, the former in an extensive obituary.[51] By his contemporaries he was remembered as a person noted for his 'brilliance of intellect and encyclopaedic knowledge'.[52] Indeed, his name had at one time been a household word on matters connected with language during the Victorian era, but his star had waned, apparently on account of his pronouncement, in 1862, that the Indo-Europeans had been of European, not Asiatic, origin. Such a view ran counter to prevailing scholarly opinion. Later developments in linguistics were to suggest that Latham may have been unduly maligned.

His professional career as a linguist began in 1839 with his appointment to the chair of English Language and Literature at University College, London.(53) Hardly had he embarked upon the post, however, than he registered as a medical student at St. Bartholomew's Hospital, London; and for some years he continued to combine the role of professor and student.(54) In 1842 he became a Licentiate of the Royal College of Physicians, London, and, in the same year, Physician to St. George's & St. James's Dispensary (now St. George's Hospital); he held this post until December 1846.(55) Thereafter he immediately assumed another, but less strenuous, post: that of Assistant Physician to the Middlesex Hosital.(56) (Prior to this, he had been appointed lecturer in forensic medicine and, later, lecturer in materia medica at the Middlesex Hospital.) By 1845, his interest in medicine had become so self-demanding that he resigned his professorship at University College, and in the following year, he took the M.D. examination and was made a Fellow of the Royal College of Physicians. Within four years, however, his interests had shifted yet again. Having resigned his two lectureships and the post of Assistant Physician, he turned to anthropology, and in 1852 was appointed Director of the Ethnographical Section of the Crystal Palace. He did not sever altogether his connection with medicine for some years yet: his name was entered in the London and Provincial Medical Directory up until 1857.

His published work was extensive, dealing mainly with anthropology and linguistics, but taking account also of literature, logic, education and medicine.(57) His contributions to the latter field of study included his translation of Greenhill's edition of Thomas Sydenham's works, originally written in Latin, together with a

Life of Sydenham.[58] Within the field of linguistics, his The English Language (first published in 1841) passed through five editions, and his Elements of Comparative Philology (1862) was justly famous as an extensive summary of the state of knowledge regarding the world's languages and language groups.[59]

There is no trace whatever in his writings of any interest in either the physiology or the pathology of language, but, in his anthropological work, he indicates how the three disciplines of medicine, linguistics and anthropology can be united to a common end. Like Prichard before him, he perceived the usefulness of a knowledge of linguistics (his term for it is 'philology') and of medicine in the study of anthropology.[60] It is sad, nevertheless, to think that his undoubted abilities and experience in the fields of linguistics and medicine never once resulted in a single word of published opinion on aphasia - and he lived through the most important years in the study of the subject, the 1860s and 1870s.

0.8.4 Morley

If the name of Henry Morley (1822-1894) is remembered at all today, it is as one of the founders of a particular style of English literary scholarship,[61] as the editor of many texts of English literature, and as an educator in the field of public hygiene.[62] However, from the point of view of this thesis, he is important in that, before moving into the field of English studies, he trained as a doctor and also wrote on the subject of neuropathology.

Morley practised as a family doctor in the West Country for five years, but gave this up in order to run a school at Liscard (near Liverpool) in 1848 and 1849. Here he taught, amongst many other things, the history of English. Later he joined the staff of King's College, London, and subsequently University College, London, as a member of the Department of English. By inclination as much as by the necessity of earning a living, his interests lay in the fields of English language and literature: he was professor of the two subjects at University College from 1865 to 1878, and thereafter until 1890 at Queen's College, London.

It was whilst he was still a student of medicine at King's College, London, that he read a paper to the Students' Medical Society on 'Minute Diagnosis of Diseases of the Brain'. This work, written as Morley himself tells us, 'with some care'(63) or as his biographer, Solly, says, 'with considerable pains',(64) was never printed, and no copy appears to have survived.(65) Whether it would have contained any account or discussion of neurolinguistic matters is conjectural. On the other hand, he was known to have been deeply interested in linguistic subjects before he entered on his medical career: the possibility of some interest in neurolinguistics can hardly be ruled out, therefore.

As with Latham, it is ironic that Morley lived through a period of intense interest in the subject of aphasia, yet never once in his works on language did he refer to it.

NOTES TO INTRODUCTION

(1) Dickson 1752.

(2) Whytt 1765.

(3) Maty 1767:261.

(4) Wyllie 1891-1894.

(5) Wyllie 1894.

(6) Lancet i, 1895:158.

(7) Pershing 1897:810.

(8) Bastian 1899:447.

(9) Billings 1880-1895, 1896-1916.

(10) Cf. Brodman 1954:105, and especially 121.

(11) In view of the changing political map, especially of Europe, during the 19th century - one thinks, for example, of the status of Poland, of the gradual emergence of a single Italian state, and of the territorial relationships between Austria-Hungary and Bohemia - present-day political labels have been used to indicate the provenance of the items. However, the four countries of the British Isles (England, Ireland, Scotland and Wales) have been grouped together for numerical purposes as a single unit.

(12) An interesting and so far inexplicable aspect of the study of aphasia in the British Isles during the 19th and early 20th centuries is that only in three Scottish universities (Aberdeen Edinburgh and Glasgow) was the subject studied for higher degrees: cf. the entries in the Bibliography for Bevan (1890), Maguire (1896), Sinclair (1900) and Craig, R.W. (1907). Furthermore, these same universities were responsible for overseeing the prosecution of research into other forms of speech pathology (Whittaker 1875, Park 1892, Wilson, G.R. 1896). There is no evidence to show that at other universities in other parts of the British Isles a similar degree of interest in speech pathologies existed between 1715 and 1916.

(13) Abercrombie c.1805-1844.

(14) There is as yet no publicly available listing, as far as speech pathology is concerned, of the contents of the archival resources of hospitals in the British Isles. The National Register of Archives' Personal Index lists the known locations of the papers of eminent figures (of DNB status), including doctors, linguists and psychologists, and this has been examined. It reveals only a relatively small amount of material germane to the subject-matter of this thesis, however.

(15) Head 1926:I, 54-60 ; Garrison 1929:643, 646; Weisenburg & McBride 1935:9-10, 11-19; Brain 1965:33-39; Marx 1966:338-340, 345; Meyer 1974: 569-571.

(16) Critchley 1964b: 234-238; Brain 1965:33-39; Benton 1974:315; Meyer 1974: 569.

(17) See Chapter 5, sub-section 5.1.

(18) Greenblatt 1964, 1965, 1970, 1977.

(19) Head 1926:I, 30.

(20) Marx 1966.

(21) Op.cit.:338.

(22) Romanes 1966.

(23) Weisenburg & McBride 1935:1.

(24) Goldstein 1948:vii.

(25) Kertesz 1979:2.

(26) Sayce's Introduction to the Science of Language (1880), apart from being one of the best written 19th century works on language, is clearly modelled on the principle that a theory of language-analysis should be applicable to all languages. See, in particular, the sections on phonetics, semantics and grammar.

(27) Cf. Thatcher 1980:235.

(28) DNBc:1218.

(29) Beddoes 1793:131-172. See also DNBc:123-124.

(30) Haslam 1835. See also DNBc:910.

(31) DNBc:2355.

(32) DNBc:1802.

(33) DNBc:871-872.

(34) DNBc:1129-1130. For further remarks on his work as a linguist, see below, p.72.

(35) DNBc:1723.

(36) DNBc:1708.

(37) Symonds 1871:141.

(38) Stocking's Introduction to the reprint (1973) of Prichard's Researches into the Physical History of Man (1813) comes closest to a critical study.

(39) Stocking 1973: Introduction.

(40) Latham 1851b:30.

(41) Prichard 1837.

(42) Prichard 1815 and 1830.

(43) See, for example, Prichard 1833 and 1843:132-133.

(44) See, for example, 1826 (2nd ed. of 1813):I, 353-355, 496-507, 522, 525-529; II, 592-623.

(45) Prichard (1849) in Herschel 1849:423-440.

(46) Prichard 1831.

(47) A reprint of the relevant section is included in Latham's new edition of Prichard (1831), published in 1857:43-44. In an appendix, Latham discusses the chronology and merits of various pre-19th and 19th century works devoted to the question of the place of Celtic in the Indo-European family (see pp. 355-356). Many years later, Tylor, the Oxford anthropologist (see p. 70 of this thesis),was to express surprise, in a letter to and quoted by Tuke, that Prichard's contribution to the question of Celtic vis-à-vis Indo-European 'is so often left unnoticed' (Tuke, D.H. 1891:7).

(48) See Prichard 1822:16-20.

(49) Stocking (1973:cxiv) gives the date of publication, incorrectly, as 1831.

(50) See, for example, Quirk 1961 and the further references therein.

(51) Brit.Med.J. i, 1888:672.

(52) Watts 1888:348.

(53) For information on his life, I have followed mainly the accounts given in Quirk (1961), Watts (1888), DNBc:1173, and the obituary in the British Medical Journal. Occasionally, there is disagreement amongst these sources as to certain facts.

(54) The records of St. Bartholomew's, which might have provided details of his student career there, were lost as a result of enemy action during World War II. (I am grateful to Miss Janet Foster, Archivist of St. Bartholemew's Hospital), for this information.)

(55) Lancet ii, 1846:673.

(56) Lancet ii, 1846:679.

(57) There is no complete listing of his work in print. I have, therefore, relied mainly on the entries in the NUC Pre-1956 Imprints and on Latham's Opuscula (1860). According to the Archives of British Men of Science (MacLeod & Friday 1972: 32/B7), practically nothing of significance in his Nachlass has survived. His papers, if still extant, are not listed in the Personal Index of the National Register of Archives.

(58) Latham 1848-1850.

(59) For a discussion of the linguistic climate in which it appeared, see Chapter 1 of this thesis. For a list of his other publications on linguistic topics, see National Union Catalog 1974:Vol.317, 482-486.

(60) See, for example, his Natural History of the Varieties of Man (1850:2-12); the same remarks are repeated in Latham 1851b: 27-28. In his essay on the 'Varieties of the human species' (Latham 1854), published as a chapter of a book on physiology, he has nothing to say about the role of the brain in speech, but provides very brief sketches of particular languages. Thus, he sums up Circassian in these terms: 'The elementary sounds ... are harsh; consonants are accumulated; hiatus [sic!] are frequent. The declension is poor. There is not even a sign for the possessive case' (Op.cit.:332).

(61) Cf. Palmer, D.J. 1965:50-53.

(62) The fullest account of Morley's life is by H. Solly (1898); see also DNBc:1424.

(63) Morley 1891:17.

(64) Solly, H. 1898:39.

(65) As Morley's son-in-law, Solly had access to 'all the family papers which were thought [by Morley's executors] to be of biographical interest' (Solly, H. 1898:vii). He does not, however, mention whether a copy of this paper was amongst them, or indeed whether it was still extant. The two packets of Morley's correspondence in the Archives of King's College, London, contain no reference to it.

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In the early 1970s, a collection of papers relating to 'Henry Morley, W.H. Wills and Charles Dickens' was known to be in private hands (MacLeod & Friday 1972: 38/C7). Whether the Henry Morley was in fact the subject under consideration or his son, also called Henry, is uncertain. An attempt to trace the present whereabouts of these papers has been unsuccessful.

CHAPTER 1

SOME ASPECTS OF THE STUDY OF LANGUAGE IN THE BRITISH ISLES IN THE 19TH CENTURY

NOTES FOR CHAPTER 1 ARE BETWEEN

PAGES 88 AND 101

1.1 Max Müller's Lectures on the Science of Language

Less than a week separates two important events in the histories of neurology and linguistics. On 18 April, 1861, Paul Broca discussed at a meeting of the Société d'Anthropologie in Paris his findings in connection with the brain of one of his patients, Leborgne. This was to lead, in due course, to the establishment of a profoundly important hypothesis concerning the cerebral localization of one particular aspect of language.(1) That same day in the British Isles, readers of The Times would have found a résumé of a lecture given at the Royal Institution in London on 13 April, by the Professor of Modern European Languages at Oxford, Friedrich Max Müller.(2) His subject was 'The Science of Language', and the lecture was the first in a series of nine. In the same way that Broca's description of Leborgne's brain and his subsequent neurolinguistic papers were to throw new light on, and raise further questions as to the nature of brain functions, so Max Müller's lectures were to be, as one listener later described them, 'the new light ... breaking forth upon the dark and then uninviting fields of Comparative Grammar and Philology'.(3) The difference between them, however, in terms of their respective subjects, was that Broca's work was to lead to developments within neurology; Max Müller's was to provide certain members of the general public with an elegantly and lucidly presented account of the nature of linguistics - nothing more.

Over the next few weeks, The Times carried relatively long digests of the first three lectures;(4) as the series progressed, the 'lecture-room was to become more and more crowded';(5) and soon the text of the lectures was to appear in print.(6) A second series, on different aspects of linguistics, followed in 1863, and these too were published.(7)

Altogether, the two series passed through fourteen editions and were translated into seven European languages: a sure indication not only of their popularity but of the importance attached to them.(8) There was certainly no other 19th century linguist whose ideas about language were to be so widely promulgated. Nor can there be any doubt that it was his exposition of the subject that established firmly in many a Victorian mind the very concept of linguistics.(9) Indeed, of all the linguists working and writing in the British Isles at this period, it was Max Müller who was quoted as the authority on language, not only in linguistics but in medicine too. Gairdner, for example, described the published lectures as 'a rich mine of thought',(10) and for Hughlings Jackson they were a 'work of importance'.(11)

1.2 Their relevance in the context of the study of aphasia

It would seem, then, that amongst at least certain members of the British medical profession in the 1860s Max Müller's work was looked upon with more than passing interest, that inasmuch as language impinged on medicine in the form of aphasia and other speech pathologies, his ideas were deemed to be relevant in some respects for a better understanding of these pathologies. Yet, how relevant were they for the study of aphasia in particular?

An immense amount of reading and thinking had gone into them. To tax (or merely delight) the minds of his audience, Max Müller quoted from an array of languages, including Old English, Chinese, Greek, Sanskrit and various languages spoken in Africa and the Middle East. Thus, he told his listeners that 'The name for <u>day</u> in modern Chinese is ǵi-tse',(12) and that '<u>Arikh</u> is used in Armenian as the name of the Medians'.(13) On the other hand, a heavy emphasis was placed on

the historical dimension of language-study: on the Graeco-Roman and Sanskrit traditions of linguistic scholarship, on the fact that, in his and many other linguists' opinion, 'the highest and most difficult problem for our science' was the question of how language originated. Almost everything - in the first series of lectures, at least - centred on the historical view-point. In the second series, the majority of the material was devoted to questions of language change, etymology and comparative mythology. Two lectures, however, dealt with the question of universal languages and with phonetics.

From this brief résumé, it is clear that little common ground existed between the study of language as exemplified by Max Müller and the type of linguistic approach required by doctors attempting to understand the nature of aphasia. Why was it, then, that doctors such as Gairdner and Hughlings Jackson saw in Max Müller's exposition of linguistics a particular relevance for the types of clinical problems they were dealing with? The answer, I believe, is that what they perceived in the apparent novelty of the 'science of language' was the possibility that some aspects of it might be of help to them. It was as if Max Müller were offering them the key to a door that had long remained shut, but they had no completely adequate conception of what lay behind that door. Because he spoke of language, and a disturbance of language was deemed by clinicians to be the cardinal feature of aphasia, they assumed that there would logically be some connection between the two subjects. Max Müller might even be accused of engineering this sense of optimistic expectancy with his comment, in the very first lecture, that until the time of Wilhelm von Humboldt, Bopp and other linguists of that generation, people had known 'every bone and

muscle, every nerve and fibre of [the human] body to the ultimate elements which compose ... flesh and blood, and yet language .... remained unnoticed'(14) - a view that was to be echoed a few years later by another British linguist, Frederick Farrar.(15) Only in his later work did Max Müller spell out those achievements of linguistics that might have been interpreted as being especially relevant to students of aphasia: 'Language seemed a very mysterious thing ... Whoever began to meditate on it, felt bewildered, like the naturalist lost in a primeval forest, and the wisest that could be said about language seemed to be that it was beyond the human conception. And now, how different! ... Give us about 800 roots, and we can explain the largest dictionary; give us about 121 concepts, and we can account for the 800 roots'.(16) His enthusiasm even led him to state that 'under the microscope of the comparative philologist language has turned out to be a very simple thing'.(17)

1.3 Linguistics, philology and the science of language

Despite the claims made by Max Müller and Farrar about the innovatory state of language-study in the 1860s and the simplistic accounts of language that had preceded their own work, there is no doubt whatsoever that in the British Isles and elsewhere many informed opinions on the nature of language had become public knowledge since at least the 17th century. In order to appreciate the linguistic background to the studies of "aphasia" from the late 18th century onwards, it is as necessary to take account of these as it is to consider the characteristics of linguistics in the 1860s and later. Firstly, however, some discussion is required of the implications of the term

'linguistics' and synonyms or near-synonyms for it such as 'philology' and 'science of language'.

1.3.1 The term 'linguistics', like some of its Continental counterparts 'linguistique' and 'Linguistik' is now established, almost without exception, as the agreed term for the discipline that is concerned with the study of language.[18] The almost universal acceptance of 'linguistics' as the name for the discipline is, however, very much a 20th century development. The word itself appears to have been first used in print in 1855 - the singular noun 'linguistic' in 1837[19] - and to have competed for recognition in the following years with other terms referring to the same subject-matter: 'comparative philology', 'glottic', 'glossology', 'glottology', 'history of language', 'linguistic science', 'modern philology', 'philology', 'philosophy of language', 'science of language', 'structure of language' and 'study of language'.[20] Of these, the two most popular in the 19th century, judging from the titles of books, were 'philology' and 'science of language'.[21]

1.3.2 The term 'philology' has often been equated with the study of the history of language (and not infrequently with the Neo-grammarian view-point). It is important, therefore, to appreciate that, in the main, this was not the definition that was given to it in the 19th century. Thus Gyll defined it as the 'science of characters, articulations, terms and propositions'.[22] Marsh, an American linguist, whose work was published in England, used it in the wider, Continental sense, to refer to the study of not only the languages but also the cultures of different peoples; he did not exclude, by his definition, the synchronic point of view.[23] Indeed, apart from Bleek's pronouncement that 'students of language will always be philologists'[24]-

which, of course, tells one nothing about the theoretical orientation of philology - those linguists who wrote books on the subject clearly used it not in the restricted sense of the study of language history, but in a wider, more general sense. Farrar's comment, in 1860, that philology was 'the science which devotes itself to the study of language'[25] and his subsequent exposition of what this entailed, indicates a general, not specifically an historical approach, and this was echoed by others in the following years.[26]

A similar definition of 'linguistics', not 'philology', is to be found in Marsh, in whose opinion linguistics was concerned with 'language itself': '[language] is the end, and the means are the study of general and comparative grammar'.[27]

1.3.3 The definitions of the term 'science of language' indicate an equally broad and less specific range of study. Max Müller claimed that the subject 'simply professes to teach what language is'.[28] About twenty years later, his colleague, Archibald Sayce, was also to imply that the point of view would be wide and not necessarily historical: 'The science of language compares and classifies sentences, grammatical relations and words; it compares and classifies languages and dialects ... it discovers the laws which govern languages in general and certain languages and dialects in particular';[29,30] but he did, admittedly, narrow it down on occasion to the 'origin of language, the nature of roots, and the means of flection'.[31] Even so, neither definition will explain why he devoted a section of his work to Broca's views on the cerebral localization of language![32] On the other hand, however, Noiré used 'science of language' in the sense of the study of the 'cradle of speech'.[33]

1.3.4 It would seem, then, on the evidence presented, that both 'philology' and 'science of language' carried varying implications for different linguists and at different times. For a clinician, depending on what he had read or simply heard, both, however, could appear to have had, in certain respects, a relevance for the study of aphasia.

1.4.1 19th century students of language

Thus far the implication has been given that the study of language as linguistics and its practitioners, linguists, were an accepted part of the intellectual and scholarly structure of British society in the 19th century. This is far from being the case. An analysis of the careers of the linguists, as distinct from phoneticians and psychologists, shows that they fall into three broad categories. On the one hand, there were 'full-time' linguists (or 'philologists' as the DNB describes them): people like Garnett, Keane, Key, Latham, Max Müller, Peile, Richardson, Sayce, Isaac Taylor Jnr., Tooke and Wedgwood.(34) On the other, there were clergymen who, for various reasons, sometimes as the result of a classical education or the fact that they also taught such subjects as English and foreign languages in schools, found themselves naturally drawn towards the study of language, and who published on the subject: Farrar, Goulburn, Jenour, Payne, Trench and Winning. Thirdly, there was a heterogeneous group, who, for reasons which it is not always possible to discover, had what might be described as a professional concern with linguistics. To this belonged such figures as Hunt (an ethnologist), Burnett and Edmonds (members of the legal profession), Stoddart (a journalist and at one time a judge in Malta - cf. Sir William Jones in India!), Smee (a

surgeon), Findlater, Marcet and Smart (authors), Beattie and Schlegel (philosophers) and Lysons (an antiquary).(35)

1.4.2 Considerable work was done on one particular aspect of language-study, namely phonetics during the 19th century, not only by people who during their life-time were known as phoneticians, such as Ellis, Melville Bell and Sweet, but by others in related and not so related fields. Some were linguists (e.g. Max Müller, Farrar, Sayce), some elocutionists (e.g. Alexander Bell, Smart), some philosophers (e.g. Bain, Murphy, Schlegel), and some were doctors (e.g. Richerand, Elliotson, Wyllie). But there were others whose main professional interests (as listed in the DNB) would seem to have naturally excluded them from the study of phonetics, but who did in fact contribute something to the subject. They included dictionary-writers (e.g. Stephen Jones, Knowles),(36) the historian William Mitford, the astronomer John Herschel, the physicist Charles Wheatstone, and two members of the third, heterogeneous group of linguists, Stoddart and Hunt.

1.4.3 In the works of certain 19th century psychologists (themselves, in many cases, philosophers by education) one finds a number of references to language. In a sense, then, people like Bailey, Calderwood, Fearn, McCosh, James Mill, and Morell (all of whom, incidentally, were described by the DNB as 'philosophers') also played a part in discussing how language should be studied; they too must be considered in any description of the state of linguistics during this period.

1.5 The growth of the formal structures for language-study

The fact that the study of language was conducted under the aegis of more than one discipline reflected the lack at this time of a single, unified professional body concerned with the study of language. To understand the reason for this, one must consider the formal structures that existed during the 19th century for studying language. To study Greek or Latin at an advanced level, one could turn to University departments in the subjects. Was there a comparable structure for the study of language in general? The answer, in bald terms, is no; although this statement needs to be modified to take account of the gradual emergence of linguistics as a subject of study at University level during the second half of the century: by then it was beginning to acquire a certain academic respectability. Furthermore, from the point of view of doctors orientating themselves in the study of language for the purposes of understanding the linguistic component in aphasia, the growth of linguistics as a focus of intellectual enquiry into language served to provide a firmer basis for some of the statements that were made about the nature of the specifically linguistic aspects of aphasia.(37)

The subject of the formal structures that existed at this time for the study of linguistics in the British Isles has never been fully investigated. The following comments must be regarded, therefore, only as a contribution to the topic.(38)

1.5.1 From the evidence assembled so far, mainly by Aarsleff (1967), it seems that until about the middle of the 19th century, the study of language *per se* was not pursued at any of the Universities. Indeed,

by as late as 1830, there was apparently not even a single scholar in the British Isles who was well enough acquainted with the type of linguistics developed in Germany and elsewhere by people like Grimm and Rask such that he could undertake a comparable linguistic investigation of English.(39) It should not seem surprising, therefore, that the first Professor of English Language and Literature at University College, London, Thomas Dale, did not regard himself as being competent to handle the philological aspect of English studies.(40) Neither Oxford nor Cambridge made proper provision for the study of Old English until after mid-century: at Oxford a Chair in Anglo-Saxon had been founded towards the end of the 18th century, but the quality of work associated with it was far from distinguished;(41) and at Cambridge, a Chair was not founded until 1867. The situation in the Scottish Universities, as far as the study of English linguistics was concerned, was little different.(42) Classes and examinations in classical philology were not held at Oxford until the second half of the century, with a paper in Honour Moderations in 1850.(43) A similar paper at Cambridge was not instituted until much later, in 1872.(44)

The first person to receive a chair in comparative philology was Max Müller, who became Professor of Comparative Philology at Oxford in 1868,(45) and his lectures on comparative philology, from 1851 onwards, were probably the first of their kind in the whole of the British Isles.(46)

Further evidence of a growing concern with linguistics, in the form of provision of courses for undergraduates, may be seen in the fact that Postgate announced that he would be giving a course of lectures on the 'principles of scientific grammar' at University College,

London, in 1883 .[47] He also taught a similar course, at Cambridge three years later, on 'general phonetics and Latin phonology'.[48] In the same session at Cambridge (1885-1886), Peile delivered a course of lectures on philology, plus one on 'word- and sentence-accent'.[49] At Oxford, again in the same session, the anthropologist Edward Tylor began a series of lectures, to be continued intermittently for many years, on linguistic topics. These included 'Languages of the world', 'Language and writing', 'The structure and development of language'.[50]

1.5.2 Outwith the Universities, a forum was provided for the discussion of linguistic matters in some of the learned societies. In the 1830s, the Etymological Society was founded at Cambridge and continued in existence for a few years.[51] And at University College, London, a Philological Society came into being in 1830. But it was with the founding, in 1842, of the Philological Society (as we know it today) that the study of linguistics began to prosper: what simply did not exist in the Universities until some years later was more than amply made up for by the regular meetings at University College, London, and by the journal published by the Society. It is not surprising, given the terms of the Society's constitution and the character of its membership, that none of the topics discussed had any connection with the pathologies of speech.[52] Instead, attention was focused on classical philology, on the contemporary and earlier forms of English, and on the structure of, in the main, non-Indo-European languages.

The complete absence of any formal mention of aphasia, especially during the 1860s onwards, in the only linguistics society in existence in the British Isles at this time, may be compared with the situation in the United States. There, in a paper read to the American

Philological Association in 1873, it was claimed that the study of aphasia might possibly contribute 'to the solution of some of the most difficult and important problems of linguistic philosophy'.(53) What the author had in mind was whether language should be considered a manifestation of an innate process or, instead, of something acquired as the result of experience. From the published abstract of the paper it is not, unfortunately, possible to follow in full the argumentation that led to this important conclusion.

1.5.3 Looking beyond the only specialist society in the British Isles devoted to linguistics to the other learned societies whose remit was more to encourage a serious interest in intellectual matters in general, not just in one specific subject, one finds evidence that linguistics and linguistic matters were being discussed. To take but one example: at the Philosophical Society of Glasgow, papers were read (and articles published) on speech acoustics,(54) Visible Speech,(55) language in general,(56) and the use of the phonograph in speech research.(57) And it was to the Society that one of the important papers on aphasia in the 1860s was read, that by W.T. Gairdner.(58)

1.6 19th century publications on the subject of language

Despite the rather piece-meal development of linguistics in the 19th century, there was certainly no lack of published material on the subject of language. Indeed, as far back as the 17th century, works had appeared which had set out a variety of opinions on both general and particular aspects of linguistics. Bearing in mind that members of the medical profession might well have wished to consult works on language in order to try to understand better what was entailed by the

'language' loss in aphasia, what works were available? Secondly, what picture of the form that language-study was taking emerges from them?

1.6.1 Leaving out of consideration articles in journals and those works whose titles contained the word 'philology', one finds a comparatively long list of books on linguistics, any one of which might have caught the attention of a medical person: Beattie's The Theory of Language (1783), Crane's The Principles of Language (1843), Gyll's A Tractate on Language (1859), Max Müller's Lectures on the Science of Language (1861 etc.), Farrar's Chapters on the Science of Language (1865), Whitney's Language and the Study of Language (1867), Key's Language: Its Origin and Development (1874), Findlater's Language (1875), Hovelacque's The Science of Language: Linguistics, Philology, Etymology (1877), Delbos's Chapters on the Science of Language (1878), Sayce's Introduction to the Science of Language (1880), Delbrück's Introduction to the Study of Language (1882) and Byrne's General Principles of the Structure of Language (1884). It will be seen from this list that the period during which a relatively large number of works were published (the 1860s,1870s and 1880s) parallels exactly the period in medicine when the study of aphasia assumed large and important dimensions.(59)

1.6.2 In the literature of phonetics, three works stand out as major contributions to the subject during the 19th century: Ellis' Essentials of Phonetics (1848), Melville Bell's Visible Speech (1867) and Sweet's Handbook of Phonetics (1877).(60) Despite the inherent technicality of much of the exposition, a medical person might well have perceived the relevance of the theoretical frameworks they proposed for the analysis of speech-sounds, for the question of tackling the

analysis of the types of articulations produced in certain neuro-linguistic conditions - one thinks here especially of dysarthria.

1.6.3 The literature of psychology contained a number of works which devoted varying degrees of space to the subject of language.(61) Any of these might have influenced a medical person's thoughts on the concept of language in relation to aphasia. Smee (1850) has an entire chapter on 'Words and language'.(62) Samuel Bailey, in the third series of his Lectures on the Philosophy of the Human Mind (1863) includes over a hundred pages on language, and deals with such topics as Tooke's views on language, on semantics, the parts of speech, and the status of linguistics as a science. J.D. Morell's Introduction to Mental Philosophy (1862) contains an entire chapter on language, 'Language in relation to the development of our ideas'.(63)

1.7 Some characteristic topics in language

Any exposition of linguistics today must, by general agreement, include major sections on the three central features of language: sound, meaning and grammar. To attempt to describe a language solely in terms of its meaning, for example, would be theoretically unacceptable. But what was the situation in the 19th century? If we consider the contents of those books dealing in some degree with language, either texts which are explicitly about linguistics or works on psychology which deal with language,(64) we find that the period from the end of the 18th century through until the 1890s can be characterized as follows.

1.7.1 The major preoccupation of the writers of books on language from the time of Burnett (1773-1792) up until about the middle of the 1860s was grammar. In most cases this took the form of a detailed discussion of the eight parts of speech in English. From the middle 1860s (e.g. Lowndes (1865)) the subject diminished in importance until it again became a central topic in Ribot (1873).

1.7.2 A second main subject of discussion, overlapping chronologically to some extent with the study of grammar, was the origin of language. In the 1860s it assumed an enormous importance and became the central concern of many linguists, their 'quaestio vexata'. The subject had been broached before then, in the 1840s, for example,(65) but it was only in the 1860s that it took on the status of the éminence grise. Farrar, William Thomson, Max Müller, Morell, Charnock, Pike, Wedgwood, Lysons, Bleek and Burgess - all devoted considerable space to it; and the subject was not free from controversy.(66) It continued to provoke discussion and argument in the 1870s, especially in 1874, and the years 1878-1880.(67)

1.7.3 What has often - superficially, it would seem - been taken to be the very epitome of all 19th century linguistics, namely comparative philology, became a subject of lengthy and detailed discussion by writers of books on linguistics during the 1850s, 1860s and 1870s.(68) In the latter decade it established itself as one of the main subjects of study within linguistics. The works by Findlater (1875), Keane (1875), Dwight (1877), Peile (1877) and Hovelacque (1877) are largely devoted to it.(69)

1.8 Aspects of language

From what has been described thus far of the forms of language-

study in the 19th century, it is evident that the squabbles over the origin of language or the intricacies of comparative philology must have seemed well removed from the particular linguistic interests of doctors. If they had sought in works on language guidance as to how to approach the analysis of aphasic language, it would surely have been in terms of understanding what was implied by words like 'language' and 'speech', and, secondly, in terms of discovering how a language might be analysed. The literature on "aphasia" contains many references to 'language', 'speech', 'word', 'parts of speech', 'syllables', and so on. To understand how they may have been interpreted by doctors, it is necessary to consider first how they were being used by linguists and other writers on language.

1.8.1 There are numerous definitions of 'language' in the literatures of linguistics and psychology,(70) but most of them can be construed as centering on two rather different concepts.(71) The first is that language is the manifestation of certain mental and/or emotional properties in the form of speech-sounds. This view is typified in the definition of language given by W.C. Fowler: 'the utterance of articulate sounds of the human voice for expressing the thoughts and emotions of the human mind'.(72) The second is simply an extension of the first: 'thoughts and emotions' are expressed not only in speech but in writing and gesture also.(73)

1.8.2 The term 'speech' was used either as a synonym of 'language'(74) or else in a more individualistic fashion: Gyll, for example, defined it as 'the image of the Soul'.(75)

1.8.3 An important difference between the view taken of language in the 19th century and that adopted by many linguists in the 20th

century is the notion that 'language' referred to the total neuro-psychological and physiological processes by which 'thoughts and emotions' were manifested in speech and, where appropriate, some other medium too. To say, for example, that an aphasic had suffered a 'disturbance of language' would have implied something different for a 19th century linguist. Whereas today it might be interpreted as meaning a disturbance of grammar or lexis and so on, in the 19th century it would have implied a disturbance of the psychological and physiological processes that participate in the production of language.(76)

1.8.4 It should not be supposed, however, that all writers on linguistic topics necessarily concurred with the two 'psychological' views of the nature of language. Thus, Marcel and Wedgwood defined language, respectively, as 'a system of signs which represent our thoughts and sentiments' and 'a system of vocal signs'.(77) Farrar, on the other hand, defined it as 'the sum total of ... articulate sounds',(78) and, later in the same work, more mysteriously, as 'the union of words and grammar'.(79) And in what must rank as one of the most cryptic of all definitions proposed by a linguist, Latham simply stated that 'Language <u>begins</u> ... [and] <u>ends</u> with voice'.(80) In these definitions, we see a move away from the view that language is a psychological process towards, with the exception of Latham's definition, ideas which have, in the 20th century, become major formulations of the nature of language.

There are further examples too from this 19th century literature to indicate that other ideas about the nature of language were beginning to circulate and take root in people's thinking; many of them look

forward to developments in 20th century linguistics. Thus, in words which foreshadow Saussure's dictum on the social contexts of langue, one reads that 'all language is necessarily a matter of compact',(81) that language is a 'social phenomenon',(82) that 'Language is a social product, at once the creation and the creator of society. It is independent of the caprice of the single individual ... The changes= undergone by language are brought about by the action of circumstances over which the individual has no control'.(83) In a similar Saussurean vein, we are told that language may be analysed without reference to its history;(84) unfortunately, there is no indication of how or why this should be done.

Maudsley, a doctor, cuts away much of the mystery surrounding the nature of reconstructed Proto-Indo-European forms when he says, in effect, that to stop the regressive projection technique at Proto-Indo-European is illogical: 'When we follow the course of development of the Indo-European languages backwards as far as we can, there is no certainty that the roots we reach are original; on the contrary, it is almost certain that they are not; that they are transformations, that what we know to have been going steadily on in historic times has gone on in pre-historic times of which we can only darkly guess'.(85)

Undoubtedly under the influence of von Humboldt's views on language, one finds the following remarks on language: 'Language is not a thing preconcerted and completed, but a power which is always in the course of active development'. It is 'not ἔργον, but an ἐνεργεία [sic!]'.(86)

1.8.5 Language, then, was viewed in sometimes different ways in the 19th century. That fact notwithstanding, what was it in language that

a doctor should focus his attention on when analysing a case of aphasia? On the question of the constituents of language, differing opinions were to be found. It was maintained, for example, that at the 'basis of language' lay 'syllables'.(87) On the other hand, it was thought that the 'two ultimate elements' were 'nominals and demonstratives'.(88) Yet another point of view, and one that was to be quoted sporadically in the literature on aphasia in the 1860s, was that at the heart of language lay 'the principles of grammar'.(89) Later on, Max Müller was to state that language consisted of 'material and formal elements', the former being 'roots': in the words GIVEN and GIFT the 'material element' is GIVE and the 'formal elements' are EN and FT.(90) However, the majority opinion amongst writers who explicitly considered the question of language was that it consisted of words: these were the 'foundation of language',(91) the 'elements of language'.(92)

1.8.6 Many definitions were proposed of the word, and they fall into two clearly differentiated categories, corresponding to the two main views that were current on the nature of language. The word was either a phonetic phenomenon - 'sounds'(93) - or else a purely mental concept. It was the latter view that predominated. Thus, continuing the tradition from the 18th century and earlier that the word was the 'symbol of ideas'(94) or the 'name of [a] thing',(95) such definitions as the following were devised: 'conceptions founded on perceptions',(96) 'signs of things',(97) 'relations of things',(98) 'instruments of all mental and moral power',(99) 'guardians of thought',(100) 'exponents of thought',(101) 'signs of ideas',(102) and 'a judgment, a separation and an inward mental conclusion'.(103) In certain of these definitions it is clear that the function as distinct from the nature of the word was being described.

Only two linguists attempted to provide a definition of the word such that it could be seen to be amenable to analysis. Marcel believed there were three 'essential features' in a word: its pronunciation, orthography, and signification.(104) And secondly, Farrar said virtually the same thing, except that his exposition was couched in somewhat opaque language. For him, the 'three factors' in a word were 'the sound, the incarnation of thought ... the inner form of the word, or the special method for this incarnation ... [and] the meaning i.e. the intuition and concepts which the word expresses'.(105) Most probably what he is describing here are the phonological, grammatical and semantic aspects of a word, but his phraseology hardly illuminates the matter, as does the lack of any attempt to explain and elucidate the three 'factors' in the passage from which this quotation has been taken.

It seems that only one person, namely John Stoddart, recognized what, from a 20th century vantage-point, must seem to be the central weakness in, certainly, the second, mentalistic, concept of the word. He described the situation as he saw it in 1849 thus: 'It is desirable, in all matters of science, that the terms employed in their discussion, should be well chosen and clearly explained ... Unfortunately these requisites have been little attended to in choosing, or explaining, the terms employed to designate what we mean, in common parlance, by the term word.(106) He then proceeded to give what was probably, until the time of Sweet and the New English Grammar of 1892, the only formal definition of a word in the whole of British 19th century linguistics: 'A Word is an articulate sound, or combination of such sounds, consisting of a Root, either alone, or combined with one or

more particles, or with one or more other words, and expressing our emotion, or conception, either solely, or together with other words, as part of a phrase or sentence'.(107) Following on from this, he set up four categories of word in English.(108, 109)

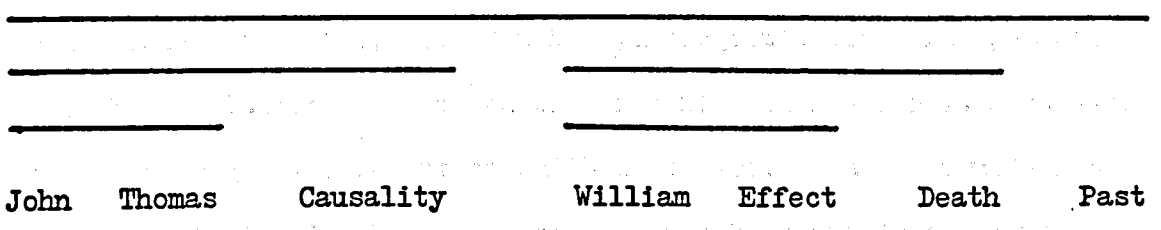
1.8.7 In Stoddart's definition of the word, the term 'root' appears. The concept of the 'root' and the techniques for uncovering the roots in individual languages were to become a major preoccupation of many linguists, both in the British Isles and elsewhere, during the 19th century. For Max Müller, roots were whatever, in the words of any language or family of languages, 'cannot be reduced to a simpler or more original form'.(110) Schlegel envisaged them as being syllables;(111) Goddes-Liancourt and Pincott as 'simple monosyllabic sounds' forming the concrete ὄνομα of language'.(112) But one linguist, Farrar, could not even accord the root such objective status. For him, it was nothing more than the 'skeleton of articulate sound';(113) a definition he was later to alter such that roots were banished to the realms of pure fantasy and speculation: 'etymologic fictions'.(114) One cannot help but wonder what a doctor could have gained from, on the one hand, the importance attached to roots in both the synchronic and diachronic analysis of language, and, on the other, the lack of agreement amongst linguists as to what the term really entailed. Had the aphasic lost his roots, or what?

1.8.8 On the first page of his Philosophy of Language (1838), William Cramp asks: 'What, then, is the nature of this science of [grammar], so repulsive to many, so imperfectly understood even by its professors?'(115) For some linguists, the long-established concept inherited from the mediaeval linguistic tradition in Europe, of grammar

being the ordering of words into a higher-level structure, such as the phrase or the sentence, remained as the only valid definition. Jenour, for example, defined it as 'the result of a right combination of words and phrases ... the etymology and formation of words, and the proper combination of them in a sentence'.(116) But for others, less specific definitions existed: 'the principles of language generally',(117) 'the logic of speech',(118) 'the highest logic',(119) 'the root of all languages'.(120) In studies of aphasia, it is the first, traditional, meaning that is used, without exception.

The treatment of the parts of speech, as classification of words, follows a very standard pattern, which was, like the concept of grammar, rooted in earlier thinking about language. Eight parts are recognized and are defined on notional-semantic grounds.(121) Occasionally, however, one sees how individual writers attempted to develop a rather different analysis. Daniel Bishop, for example, regarded them as being, in turn, the representatives of three 'great classes of words': substantives, attributives and particles.(122) Kavanagh argued that in the sentence 'This boy is my brother', there cannot be two substantives since only one substance is involved!(123) But perhaps the most original observation came from the anonymous author of the article 'Thought and language'.(124) He argued that the parts of speech cannot be defined on notional grounds, but must be defined, instead, on the basis of their morphological and syntactic characteristics.(125) It may be coincidental that the most original thinker on matters connected with aphasia - at least in the British Isles - Hughlings Jackson, was conversant with this very article and quoted from it on a number of occasions.(126)

1.8.9 Before leaving the topic of grammar, we should take note of the ideas about grammatical analysis expressed by the London surgeon Alfred Smee in his book The Process of Thought Adapted to Words and Language,[127] not only because of his professional involvement in medicine, but also because he anticipates certain concepts in 20th century linguistic theorizing: in case grammar, for example. Smee tries, in fact, to show how the brain might process language, or, as he puts it, 'how a sentence ... would have acted on the brain'.[128] Thus, the sentence 'John and Thomas killed William' would be 'resolved' as follows:[129]



The rationale behind this is that 'we first set down the designation of the thing or person that first undergoes a change. This becomes a cause ... We next note the noun that is affected, and the value of the effect produced; and, finally, we designate the time at which the whole series of changes occurred'.[130] What Smee fails to explain, however, is how his method of analysis can be said to mirror the functioning of the brain.

1.8.10 The role of language in the process of thinking is remarked upon by a number of writers; the topic is not so much discussed as set out as a foregone conclusion. In view of the question of the relations between a disturbance of language and a disturbance in intellectual abilities, particularly thinking, in aphasics, the lack of any careful sifting of the evidence either way in favour of a connection of some sort between the two phenomena is to be regretted. Two typical comments

are: 'language is the great instrument by which the mind acts',[131] and 'thought is accomplished by means of words alone'.[132] Characteristic of other views which emphasize the strong possibility of a connection but stop short of considering it as beyond dispute, is this comment by Farrar: 'Thought and speech are inseparably connected'.[133] As far as can be judged, only three people took the opposite point of view: that language and thinking are not by any means as closely connected as might be supposed. Lowndes says laconically that 'thought [is] the master of language, not its servant';[134] the anonymous author of 'Thought and language' argues emphatically against the connection;[135] Ribot, the French psychologist whose work appeared in English translation,[136] makes what for his contemporaries must have seemed an original observation on this subject, when he argued that since the distinction between parts of speech in the Indo-European tradition does not exist in a third of the world's languages, yet the mental processes in all people must be the same, then the use of Indo-European based categories of language for the analysis of thought cannot be justified. Ergo, to maintain that language and thinking are one and the same thing, or even connected, is, as yet, unproven.[137]

1.8.11 A few words are necessary on the state of phonetics, because clearly this would appear to be the subject which ought to have attracted some attention from doctors concerned with the actual analysis of aphasic forms of language. Considering only the three major classics, by Ellis (1848), Bell (1867) and Sweet (1877), one finds a framework for the description of segmental and non-segmental phenomena: the organs of speech, laryngeal activities, the classification of vowels, the description and classification of consonants, the nature of

syllables, accent, quantity, and pitch. Bell, in his statement on the ten actual or potential applications of phonetics, or rather of Visible Speech, includes two which impinge on the domain of medicine and education: 'teaching the deaf and dumb to speak' and the 'prevention and removal of defects and impediments of speech'.(138) There is no mention, however, of speech pathologies such as aphasia - nor is there in the whole of his published works on phonetics.

During the 19th century, much was learnt and published about other aspects of phonetics, such as the acoustics of vowels,(139) speech synthesis,(140) and phonetic alphabets.(141)

1.8.12 Four further topics deserve to be mentioned as they relate to the work that was done on aphasia. Child language received a very brief mention in the works that have been examined;(142) the relationship of so-called 'animal language' to 'human language' was also touched upon;(143) the linguistic abilities of the deaf and dumb received some attention;(144) and, fourthly, and most important of all, we find references to the state of knowledge regarding language in the brain.

1.8.13 The first time that this topic is mentioned is 1859, in James Hunt's book, a Manual of the Philosophy of Voice and Speech. Chapter II is headed 'The Nervous System', but it contains far more on the cranial nerves than on the structure of the cerebrum; nothing is said about the neural basis of language. However, further on, under the heading of 'The Organ of Language', the subject is dealt with in more detail.(145) Hunt asks whether 'a special organ of speech' exists in the brain, and, if so, where it is located. After mentioning Gall, Bouillaud, and quoting examples of what he calls 'dumbness' from a

handful of authors - 'blow on the head ... lost knowledge of Greek',(146) 'lost ... the power of pronouncing substantive nouns'(147) - he concludes that 'the chief influence is exercised by the anterior lobes of the brain'.(148) Virtual silence then followed for ten years - ironically at a time when neurolinguistics became one of the major talking-points in medicine - before the topic was raised again in the linguistics literature. Whately noted that a connection was supposed to exist between 'a distinct portion of the brain' and a 'certain distinct Faculty of Language'.(149) But it was some eight years later, well after the major controversies on neurolinguistics had died down, that in the English translation of Hovelacque's La Linguistique of 1876,(150) the importance of neurolinguistics for linguistic theory is spelt out: '... the results of the important studies made in France on [the] subject of a cerebral lesion resulting in the loss of speech do not yet seem to be sufficiently known ... It may at the same time help to throw further light on the true nature of philological research'.(151) What the 'further light' or the 'true nature of philological research' actually are is not, unfortunately, vouchsafed! Sayce, however, was telling his readers about Broca's researches and that the 'faculty of speech' was in the 'posterior half of the third frontal convolutions of the right or left hemispheres'.(152) In this opinion he was supported, to some extent, by Max Müller who maintained that the 'faculty of speech' was located in more than the left inferior frontal gyrus.(153) And lastly, Byrne, however, went so far as to state (without adducing any evidence for his conclusion) that 'nouns and verbs may be located in different parts of the middle lobe'.(154)

1.9 Summary and conclusions

In the British Isles, the study of language has a long and respected scholarly ancestry. By the end of the 18th century, it was mainly the work of philosophical linguists such as Tooke and James Burnett (Lord Monboddo) which helped create a set of attitudes towards language amongst the educated public. Thereafter, during the 19th century, three topics tended to dominate much of the discussion of language: traditional grammar, the origin of language and comparative philology. The tradition of phonetic studies, dating back to at least the 17th century, was, however, maintained in tandem with the study of linguistics.

A fairly extensive literature on aspects of language was published by linguists, phoneticians, psychologists and others. It is possible to conclude from it that there was no single agreed approach to the study of language. Two main concepts of 'language' were in use: 'language' as the manifestation of thoughts and emotions in sound, and, secondly, more widely, in sound, writing and gesture. Little agreement existed on what constituted the basic elements of language, although on balance the majority opinion centered on the concept of 'words'. Little was said formally about how language might be analysed: there was certainly nothing corresponding to the 20th century view (except in the work of linguists such as Sayce) that such an analysis should encompass the phonetic, grammatical and semantic features of language. And unlike, for example, Germany, there never appeared to be in the British Isles a school of thought on linguistic matters which dictated much of the thinking about the subject.

The implication of the above for the study of aphasia is that in the absence of any concerted and generally accepted approach to the study of the nature and synchronic analysis of language, it would not seem surprising if clinicians tended to adopt an individualistic view of language in their discussions of the linguistic symptoms of their patients. In brief: the general tone of linguistic enquiry in the British Isles was spiritually removed from the aspect of language-study that clinicians were concerned with. Questions about the origin of language, the historical relationships between languages or even the philosophical bases of grammar appeared well removed from their sphere of interest.

In the following Chapter, I consider the development of neurolinguistic studies between 1793 and 1862.

NOTES TO CHAPTER 1

(1) See below, Chapter 3.

(2) Shortly after arriving in England from Germany in 1846, Max Müller chose to use the 'double-barrelled' version of his name - his surname was Müller - and this appellation has generally been used of him ever since. It has the advantage, in any case, of distinguishing him not only from Johannes Müller, the physiologist and phonetician, some of whose work will be discussed later (see p.143), but also from two other linguists of the same name, Friedrich Müller and Otfried Müller.

(3) Satish Chandra Banerjee, quoted in Max Müller, G.M. (1902:I,248).

(4) The Times 18.4.1861:9; 24.4.1861:5; 7.5.1861:8.

(5) Max Müller, G.M. 1902:I,247.

(6) Max Müller, F. 1861.

(7) Max Müller, F. 1864.

(8) Max Müller's widow maintained that six translations appeared: French, German, Italian, Russian, Swedish and either Hungarian or Dutch (Max Müller, G.M. 1902:I,248, II:453). However, a Polish edition was issued in 1867 (see the entry in the British Museum General Catalogue of Printed Books, 1963: Vol.166, 199).

(9) This is not to say, however, that Max Müller should be regarded necessarily as an original thinker on the subject of language. Much of his fame rested on his ability to make a difficult subject comprehensible.

(10) Gairdner 1865-1868:118.

(11) Jackson, J.H. 1866b:442. See also Robertson, A. 1867a:509; 509; British Medical Journal ii, 1866:261; Wilks 1868:57. Burrow (1967) provides a useful sketch of the effect of Max Müller's views on, particularly, anthropologists. He makes no mention, however, of doctors.

(12) Max Müller, F. 1861:293.

(13) Op.cit.:246.

(14) Max Müller, F. 1861:26. Such a generalization may have had the effect of making his audience at the Royal Institution take particular note of why linguistics should be regarded as an important subject of study, but in reality it was an unfortunate distortion of the sort of progress that had hitherto been achieved in linguistic studies. For example, as a Sanskritist, Max Müller could hardly have failed to appreciate the outstanding merit of Pāṇini, in particular, in Ancient Indian linguistics.

(15) 'The spirit of inquiring wonder was so little directed to any single phenomenon of human speech, or ... when directed ... [was] for long ages so erroneous in its methods and so narrow in its conditions' (Farrar 1870:6).

(16) Max Müller, F. 1887:551.

(17) Max Müller, F. 1888:34.

(18) Differences of opinion remain, however, as to the delimitation of the subject from other disciplines such as phonetics and psychology and also as to the manner in which the actual study of language should be conducted.

(19) OEDc:1632.

(20) All appear in textbooks of linguistics during the 19th century. The oldest pre-decessor of 'linguistics' was 'glossology', a term that dated back to the early part of the 18th century (see OEDc:1159). Stoddart popularized it for a time in the titles of his two books on language (1849, 1858). In 1849 he used it solely in the sense of the study of the history of language (1849:3); in 1858 it was extended to cover both synchronic and diachronic phenomena (1858:1).

(21) A comparable survey for German and French reveals the following. 'Sprachwissenschaft' occurs more frequently than 'vergleichende Sprachwissenschaft', 'Sprachlehre', 'Sprachstudium' and 'Sprachgeschichte'. In French, 'la linguistique' - a term, incidentally, which Max Müller considered 'somewhat barbarous' albeit 'convenient'! (Max Müller, F. 1861:3-4) - competed with 'la science du langage', 'la science comparative des langues', 'l'analyse du langage', 'la glossologie' and 'la philosophie du langage'.

(22) Gyll 1859:102.

(23) Marsh 1862a:52 (=1862c:19); 1862b:25.

(24) Bleek 1868:36.

(25) Farrar 1860:4.

(26) See, for example, Sayce 1874:1-2; Keane 1875:1; Hovelacque 1877:1; Peile 1877:5.

(27) Marsh 1862a:52 (=1862c:19).

(28) Max Muller, F. 1861:11.

(29) Sayce 1880:I,137.

(30) An indication of the extent to which the languages of the world had been subjected to some form of linguistic scrutiny up until 1882 may be gauged from Trübner & Co. (1882). This list of the grammars and dictionaries of the 'principal languages and dialects of the world' is restricted to 'those approved Grammars and Dictionaries that could be obtained without difficulty' (Op.cit.:iii). The total runs to almost 3,000 titles.

(31) Sayce:I,135.

(32) Op.cit.:II,302-304.

(33) Noiré 1879:64.

(34) To this list might be added those foreign linguists, some of whose work was published in the British Isles, and who, therefore, may be said to have formed part of the background to linguistic thinking in the 19th century: Abel, Bleek, Delbrück, Hovelacque, Marsh, Noiré, Paul and Whitney.

(35) It has not been possible to discover the occupations of Burgess, Byrne, Benjamin Clarke, Hyde Clarke, Cramp, Crane, Delbos, Dwight, Goddes-Liancourt, Gyll, Jenour, Kavanagh, Lefevre, Le Mesurier, Marcel, Marshall, Pincott, Prince, Reehorst, Weisse and Welsford.

(36) Knowles was the only compiler of a pronouncing-dictionary to comment, albeit fairly obliquely, on the role of the brain in speech (see Knowles 1855:1-4). (I have used the 9th edition of 1855; the 1st edition was published in 1835.) He refers, in fact, not to the neurology of speech, but to phrenology, and also, drawing heavily on Lockean philosophical ideas, to the 'powers, passive and active, of the human brain, and the impressions made on it, which altogether form what is called the mind, intellect, or understanding' (Op.cit.:2).

(37) See especially the comments on language in the 1860s in the aphasia case-reports, Chapter 4, sub-section 4.6.2.

(38) The secondary literature on earlier studies of language in the British Isles is somewhat uneven. There are a considerable number of studies of individual phoneticians (e.g. Newton, the Royal Society School, Bell, Sweet), but no comprehensive overview of the field. As far as linguistics is concerned, much work has been done in assessing

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various topics in linguistics up until 1800 (e.g. Adams on the study of Old English, 1917; Michael on English grammar, 1970; Knowlson on universal language schemes, 1975; Hayashi on lexicography, 1976). But all stop just short of or at 1800. Aarsleff has continued the survey up until 1860, but restricted it to the growth of philological studies and the rise of the Philological Society (Aarsleff 1967). Palmer has done signal service in this field by describing the growth of English studies, both in the Universities and in the field of non-University education, for this period (Palmer, D.J. 1965). A comprehensive study would need to consider not only the provision of courses in linguistics in the University and non-University sectors, their orientation and quality, and the ways in which ideas about linguistics filtered through to the general public at meetings of societies, but also the very extensive use made of certain linguistic concepts in areas such as anthropology and psychology.

(39) Aarsleff 1967:176.

(40) Op.cit.:178-179.

(41) Op.cit.:169-170.

(42) Op.cit.:178-179.

(43) Clarke, M.L. 1959:113.

(44) Op.cit.:122.

(45) From 1851 to 1854 he had been the deputy professor in the subject; there was no full professorship, however.

(46) Equating the beginnings of a field of study at University level with the establishment of lecture courses and chairs can, however, be fallacious. For example, the Department of Phonetics at University College, London, was established in 1907, but for many years prior to that, a knowledge of phonetics had been considered a prerequisite for certain branches of University study; the subject was evidently being taught, under the heading of English, in the schools. Thus, one of the questions in the Matriculation Examination to London University in 1864 required candidates to answer the following: 'How many Vowel Sounds are there in the English language? Make a list of them, showing by how many modes of spelling each may be represented giving in each case a word containing the sound you wish to distinguish' (London University Calendar for the Year 1865:xiii).

(47) Academy 23, 1883:262.

(48) Academy 30, 1886:264.

(49) Academy 28, 1885:261.

(50) A full list is given in Freire-Marreco 1907:394-395, 400, 402-403, 405-409.

(51) Aarsleff 1967:213, 217.

(52) An examination of the entire contents of the Proceedings (later Transactions) of the Philological Society from 1842 to 1894 shows that the subject of aphasia was never formally raised at any meeting of the Society and that no article was published on the subject. Indeed, there were only three occasions during this period when the subjects of medicine and of abnormal speech were touched upon. Wedgwood (1860-61: 30-33) gave examples of words in English and other languages which cluster, both phonetically and semantically, around the word 'stammering'; Graham Bell described to the Society the usefulness of Visible Speech as a means of helping congenitally deaf persons to speak (Tr.Philol.Soc. 1880-1881:258); and, thirdly, at a meeting of the Society in 1888, Furnivall gave an account of the life of Thomas Vicary, the first Resident Surgeon Governor of St. Bartholomew's Hospital, London, and of his work Anatomie of the Body of Man, first published in 1548 (Proc. Philol.Soc. 1888-1890 (Appendix to Tr. Philol.Soc.)x-xii). The paper by C.A.M. Fennell, entitled 'On muscular economy in speech', of which no text or abstract was published (Tr.Philol. Soc. 1875-1876: Appendix, 20) was very probably to do with assimilation, and not specifically with the physiology of speech. (In this connexion, one might mention the curious use of the expression 'pathology of human speech' by the linguist Benjamin Dwight (see Dwight 1877:53). He used it as a cover-term for such diachronic changes in language as assimilation, dissimilation, epenthesis and apocope).

Spot-checks of the membership lists of the Philological Society show that the majority of members were either clergymen, University lecturers or school teachers. In 1869, however, at a time when information about neurolinguistic matters was beginning to appear in some of the textbooks on linguistics (see above, p.84), the name of 'Dr. Brette of Christ's Hospital, London' appeared in the list of members (Tr.Philol. Soc. 1867: Appendix, 2). He was not a doctor in the medical sense, but the Rev. Dr. P.H. Ernest Brette, who had been Head of the French Department at the School since July 1863; he held the post until early in 1893 when his death was recorded in the Hospital's records. (I am grateful to Mr D.R. Young of Christ's Hospital for this information.)

(53) Easton 1873:11.

(54) Herschel, A.S. 1870-1871.

(55) Jones, T.H. 1880-1882.

(56) Max Müller, F. 1890-1891.

(57) McKendrick, J.G. 1896-1897.

(58) Gairdner 1865-1868.

(59) The extent of the literature on linguistics, published in the British Isles during the period under consideration, may be seen from the following list. As well as including items which deal with one particular aspect of linguistics, e.g. the origin of language, it also includes a certain number of works on the subject of English grammar. The list is based, primarily, on entries in the English Catalogue of Books. It does not take account of the periodicals literature. 1773-1792:Burnett; 1783:Beattie; 1815:Richardson; 1819:Smart; 1824, 1827:Fearn; 1832:Jenour; 1838:Cramp, Winning; 1843:Crane, Payne; 1844:Kavanagh, Marcet; 1845:Welsford; 1847:Schlegel; 1849:Clarke,B., Stoddart; 1851:Latham, Smee; 1852:Trench; 1853:Clarke, H., Marcel; 1855:Le Mesurier, Reehorst, Smart, Trench; 1856:Edmonds, Kavanagh, Latham; 1857:Fowler; 1858: Stoddart; 1859:Asher, Clarke, H., Dwight, Garnett, Gyll, Hunt; 1860:Farrar, Gyll (2nd edition of 1859), Tooke; 1861:Max Müller; 1862:Marsh (a,b,c), Latham; 1864:Max Müller, Taylor, I.(Jr.); 1865:Farrar; 1866:Wedgwood; 1867:Whitney; 1868:Lysons; 1869: Bleek, Burgess, Goulburn; 1870: Farrar, Whitney (3rd edition of 1867); 1874:Goddes-Liancourt & Pincott, Key, Sayce; 1875: Findlater, Keane, Whitney; 1876:Whitney; 1877:Dwight (2nd edition of 1859), Hovelacque, Peile; 1878:Delbos, Marshall; 1879:Noiré; 1880:Sayce, Whitney (2nd edition of 1876); 1881: Max Müller; 1882:Abel, Delbrück; 1883:Whitney (4th edition of 1875); 1884:Byrne, Whitney (4th edition of 1867); 1886:Price; 1888:Paul; 1892:Byrne (2nd edition), Sweet, Whitney; 1894: Lefèvre.

(60) As with the question of the development of linguistics in the British Isles, there has been no full-length and detailed study of the development of phonetics. The following list, arranged chronologically, may be regarded as an initial contribution to the establishment of a bibliography of the subject's primary literature. In the main, it takes no account, however, of work that appeared in periodicals, nor does it draw a distinction between those contributions which were merely expositions of basic principles (or other people's work) and those which were of a more original and/or advanced character:-

Anon. (1796), Fulton & Knight (1802), Mitford (1804), Richerand (1812), Jones, S. (1818), Smart (1819), Bell, C. (1821), Goold (1822), Abernethy (1827), Arnott (1827), Hall (1831), Willis (1831), Bell, C. (1832), Fulton & Knight (1833), Willis (1833), Wright (1835), Bell, A. (1836), Wheatstone (1837), Müller (1838), Winning (1838), Elliotson (1840), Henslowe (1840), Ellis (1844), Herschel, J.F.W. (1845 - written in 1830, see 1845:820; 1849), Ellis (1845), Young, T. (1845)(new edition of 1807), Carpenter (1846), Schlegel (1847), Ellis (1848), Stoddart (1849), Bishop (1851), Latham (1851),

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Kirkes & Paget (1851), Romberg (1853), Clarke, H. (1853), Knowles (1855), Max Müller, F. (1855), Smalley (1855), Kavanagh (1856), Goodrich & Atkinson (1856), Stoddart (1858), Hunt, J. (1859), Gyll (1859), Cooley (1861), Lepsius (1863), Nuttall (1863), Bain (1864), Reid, A. (1864), Farrar (1865), Longmuir (1865), Salter (1866), Bell, A.M. (1867), Bain (1868), Ellis (1869-1889), Murphy (1873), Key (1874), Findlater (1875), Peile (1877), Sweet (1877), Marshall (1878), Sayce (1880), von Meyer (1883), Price (1886), Bell, A.M. (1887, 1889), Sweet (1890a,b), Lefevre, A. (1894), Wyllie (1894).

(61) As a basic bibliography, I have used the entries in Baldwin (1905:III,923-964) and in the English Catalogue of Books (1801-1880). The development of psychology as an academic subject of study has certain parallels to that of linguistics. In the same way that 19th century linguistics drew some of its inspiration from the work done in earlier centuries (on 'traditional grammar' and 'universal grammar'), so psychology continued and in time reacted to the tradition of philosophical speculation on the nature of the mind represented in the work of figures such as Hobbes, Locke and Hartley. Also, the slow growth of the formal structures for the study of language (see above, p.68) had a counterpart in psychology: it was not until 1875 that psychology became a University subject at Cambridge, and later still (1897) before psychological laboratories were established at Cambridge and at University College, London (see Misiak & Sexton 1966:229; Hearnshaw 1964:168-184).

(62) Smee was, admittedly, a surgeon, not a professional psychologist. See also Smee (1851) and the comments thereon, p.82 of this thesis.

(63) Although this thesis is deliberately restricted to a consideration of work carried out or published in the British Isles, two works on psychology by American authors should not go unnoticed, since they contain considerable information on language. Thomas Upham's Elements of Mental Philosophy (1843) discusses, in the space of more than 50 pages, such topics as the language of the deaf and dumb, the various sign language systems in use amongst certain North American-Indian tribes, the origin of language, and writing systems (see pp.417-470). And Frederick Rauch, in his Psychology (1844), has 17 pages on types of language, etymology, grammar and written language (see pp. 251-267).

That language never established itself as being an essential topic for inclusion in every textbook on psychology is shown by the absence of any information on it in works which, by their very titles, might have suggested that at least some consideration would have been given to it. For example, Ballantyne's An Examination of the Human Mind (1828),

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Mudie's Mental Philosophy, Payne's Elements of Mental and Moral Science (1845) - but see Payne (1843) for a discussion -, Ramsay's Principles of Psychology (1857) and Rosmini Serbati's massive, three-volume work, Psychology (1884-1888) - all contain not one word on the subject. (See also Boyle 1838, Douglas 1839, Lyall 1855, Pirie 1858, McCosh 1865, Jardine 1874, Maudsley 1879, Cocker 1882.)

(64) Works on phonetics have been omitted from this discussion.

(65) See Schlegel 1847; Clarke, B. 1849. In America, Upham 1843 had devoted some space to it.

(66) Cf. especially Wedgwood's arguments against Max Müller, (Wedgwood 1866).

(67) See Goddes-Liancourt & Pincott 1874; Key 1874; Sayce 1874; Delbos 1878; Noiré 1879; Sayce 1880. (The bibliography in Hewes 1975 is far from complete.)

(68) See Dwight 1859; Gyll 1859; Farrar 1860; Latham 1862; Farrar 1870. De Vere (1853), an American, includes a section on it.

(69) Rather earlier than this, in a lecture at Manchester in 1869, Wilkins had virtually equated the 'science of language' with comparative philology (Wilkins, A.S. 1869). See especially his remarks on p.5.

(70) The variety of conceptions and definitions of language is summed up neatly by Max Müller: 'Call language a mass of imitative cries, or a heap of conventional signs; let it be the tool or the work of thought; let it be the mere garment or the very embodiment of mind', (Max Müller, F. 1873:527).

(71) The comments on the nature of language by John Marshall (1818-1891), later to be Professor of Surgery at University College, London (see DNBc:1326), in his textbook on human anatomy (Marshall, J. 1860), may well reflect what was for many mid-Victorians an accurate summary of the role of language in society, but for a clinician - and after all, Marshall was a doctor - they offered absolutely no guidance on how disordered forms of language should be analysed. 'Language' (or 'speech'), he says, is 'the peculiar gift of God to man as a social creature; the chief, direct, and ready reflection of human thought and feeling; the logical derivative of our intellectual operations; the exponent of our animal necessities, moral capacities, and spiritual aspirations; the indispensable agent and record of our progress upon earth; the great lever of continuous civilisation; the voice of love to our neighbour, and of thanksgiving and prayer to our Creator, Preserver, and Saviour', (Marshall, J. 1860:I,146).

(72) Fowler, W.C. 1857:1. For other, similar, definitions, see Burnett 1773:I,5-6; Payne 1843:1; Hunt 1859:125; Key 1874:1; Sayce 1874:8; Thompson, 1884:I,23. It is perhaps of interest to note that the Encyclopaedia Britannica (to which some doctors might have turned for guidance as to the meaning of the word 'language') defined 'language' as 'the expression of our ideas and their various relations by certain articulate sounds', and that no major change occurred in this definition until the 11th edition of the work in 1911, when the following appeared: '[language is] the whole body of words as used in common by a nation, people or race, for the purpose of expressing or communicating thoughts by verbal utterance' (Encyclopaedia Britannica 1911:XVI, 179). Many other encyclopaedias at the turn of the 19th century followed essentially the definition given by the Britannica, for example the English Encyclopaedia (1802), the Edinburgh Encyclopaedia (1808-1830) and the Encyclopaedia Perthensis (1806).

(73) See, for example, Jenour 1832:9; Stoddart 1849:1; De Vere 1853:17; Findlater 1875:7; Marsh 1862a:31; Porter 1872:327; Sayce 1880:I,2; Sully 1884:248, 337-338; Price 1886:1.

(74) Cf. the definitions given by Burnett 1773:I,1; Jenour 1832:17; Crane 1843:1; Schlegel 1847:388; Laurie 1859:v; Lysons 1868:5; Goulburn 1869:6; Stoddart 1849:1, 291; Stoddart 1858:70; Peile 1877:144.

(75) Gyll 1859:1.

(76) It is not the purpose of this thesis to compare the philosophy of language (or rather the philosophies of language) espoused in the 19th century with those of the 20th century, but it is of importance to note that the role of meaning in the total conceptualisation of language is rarely mentioned in 19th century discussions of language. This may be compared with, on the one hand, the situation today and, on the other, with the view expressed by Harris in 1751, that in language there are 'certain Sounds, having certain Meanings ...the Sound is as the Matter ... the Meaning ... [the] Form' (Harris 1751:315). The attractiveness of such a definition, in the eyes of today's linguists, became obscured in the 19th century by the attempts to explain the total mental process that underlies the production of meaningful speech-sounds.

Bailey, S. (1863:136-147) and Kirchner (1888:251) contain some remarks on diachronic changes in meaning. A major 19th century text on semantics, lately re-discovered, is Alexander Johnson's A Treatise on Language (1836) (see also his The Meaning of Words (1854)). Johnson was an English-born economist who settled and worked in America. Another, hitherto unnoticed work is an anonymous article entitled 'Thought and language' published in 1866 (Anon. 1866a). In it the author breaks with the accepted view that language has some close connection with the process of thinking, in the sense that

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words are used for the actual mechanism of thinking. He bases his opinion on the fact that 'the process of putting parts of speech together in order to reach a meaning is not a process in which we add meaning to meaning, but the very reverse' (Op.cit.:572). He instances, for example, the collocation of BLACK and BIRD: when the two words are joined to form the word BLACKBIRD, part of the meanings they have in isolation is lost (Op.cit.:570).

(77) Marcel 1853:97; Wedgwood 1866:13.

(78) Farrar 1860:2.

(79) Op.cit.:62.

(80) Latham 1862:697.

(81) Bishop, D. 1849:38.

(82) Sully 1884:349; 1892:428.

(83) Sayce 1880:I,133-134.

(84) Carlile 1851:103.

(85) Maudsley 1876:500.

(86) Morell 1862:189. Cf. also Farrar's comment that 'the δύναμις or potential faculty of [speech should be] distinguished from the ἐνέργεια or actual exercise' (Farrar 1870:8). He claims (loc.cit.) that he had made the self-same point in his first book on language, his Origin of Language (1860). I can find no evidence to this effect in the earlier work.

A beautiful anticipation of one of Chomsky's tenets is the following from Bain: 'Scarcely any succession of words, uttered in everyday intercourse, is precisely the same as any other succession formerly said or heard by the speaker' (Bain 1864:587).

(87) Schlegel 1847:461.

(88) Burgess 1869:26.

(89) Ferrier, J.F. 1856:13.

(90) Max Müller, F. 1888:21. The closeness of this analysis to the concept of lexical and grammatical morphemes is worthy of note.

(91) Clarke, B. 1849:10.

(92) Marcel 1853:II,4. Cf. also Lysons 1868:28.

(93) Jenour 1832:12. Cf. also the similar definitions in Stoddart 1849:1-2; Crane 1843:1-2; Farrar 1865:69; Sully 1884:251.

(94) Harris 1751:20 ; cf. Farrar 1860:39.

(95) Tooke 1860: 9 ; cf. Farrar 1860:38.

(96) Garnett 1859:284; cf. Farrar 1860:39.

(97) Gyll 1859:1.

(98) Garnett 1859:282; cf. Farrar 1860:39.

(99) Clarke, B. 1849:10.

(100) Trench 1852:21.

(101) Fowler 1857:13.

(102) Marcel 1853:II,4.

(103) Morell 1862:200. See also Thompson, D.G. 1884:28, 34.

(104) Marcel 1853:II,4.

(105) Farrar 1865:287-288.

(106) Stoddart 1858:308.

(107) Op.cit.:310.

(108) 'Radical' (e.g. MAN), 'inflected' (e.g. BEATEN), 'derivative' (e.g. WILFULNESS), and 'compound' (e.g. HORSEMAN) (Op.cit.: 312-322). Some years previously, Marcel had drawn a distinction between 'articulate' and 'alphabetical' words (Marcel 1853:I,100). Later, Farrar was to contrast 'Matter-words' (e.g. nouns and verbs) and 'Form-words' (e.g. pronouns and particles).

(109) The only person, linguist or psychologist, who appears to have recognized that major problems can exist in defining the word in other languages was Lowndes. He considered the analysis into words of the Latin form AMAVI. If we follow, he says, the traditional view that a word expresses a thought, then in AMAVI, since there are three thoughts, there must, by definition, be three words. He concludes that 'For grammatical purposes, i.e. for what concerns the science of thought as exhibited in speech, these prefixes or suffixes are distinct words' (Lowndes 1865:167). Regrettably, he does not explore the implications for English of the equation 'one word = one thought'.

(110) Max Müller, F. 1861:256.

(111) Schlegel 1847:461.

(112) Goddes-Liancourt & Pincott 1874:14. It is unclear from their discussion whether their concept of the 'onomatop' can be equated directly with the root (Op.cit.:53).

(113) Farrar 1860:51.

(114) Farrar 1865:58.

(115) Cramp 1838:1.

(116) Jenour 1832:27. Cf. also Cramp 1838:7; Latham 1862:699.

(117) Crane 1843:1.

(118) Trench 1852:22.

(119) Gyll 1859:1.

(120) Ferrier, J.F. 1856:13.

(121) Fearn 1820:402-500; 1824 and 1827:passim; James Mill 1829:100; Crane 1843:2; Payne 1843:passim; Marcel 1853:II, 5; Edmonds 1856:1 et seq.; Latham 1856:222; Bailey, S. 1863:85-192; Lowndes 1865:170-175.

(122) Bishop, D. 1849:39-40.

(123) Kavanagh 1844:22.

(124) Anon. 1866a.

(125) 'The proper ground for a grammatical definition, and the only proper ground, is difference of form; and when detached from context, a part of speech should happen to have no form by which it can be known, we have to wait for the known form of the part to which it is joined; or if this should fail, which in our language is often the case, then we must be guided by the relative position of the two parts, as in determining the adjective and substantive in the constructed nouns chestnut horse and horse chestnut.' (Op.cit.:70).

(126) See Jackson, J.H. 1878-1879:312.

(127) Smee 1851.

(128) Op.cit.:17.

(129) Op.cit.:23-24.

(130) Op.cit.:23.

(131) Bishop, D. 1849:38.

(132) Noiré 1879:35. See also Clarke, B. 1849:10; Marcel 1853: II, 4; Peile 1877:138; Kirchner 1888:251.

(133) Farrar 1860:40-41. See also De Vere 1853:17; Smart, B.H. 1855:1; Delbos 1878:4; Sully 1892:I, 411.

(134) Lowndes 1865:166.

(135) Anon. 1866a.

(136) Ribot 1873.

(137) Op.cit.:53. (Ribot was a firm advocate of psychologists familiarizing themselves with and using concepts from linguistics in their approach to problems of a psychological nature; he does not elaborate, however (Op.cit.:50).)

(138) Bell,A.M. 1867:20. See in this connection Jones' paper to the Philosophical Society of Glasgow on Visible Speech (Jones, T.H. 1880-1882).

(139) Willis 1831; Helmholtz 1885; Hunt 1859; Key 1874.

(140) Wheatstone 1837; Hunt 1859. See also the review of the literature on the subject by Köster 1973.

(141) Henslowe 1840; Ellis 1845, 1848; Max Müller 1855; Lepsius 1863; Bell, A.M. 1867; Sweet 1877.

(142) Bain 1864:440 has some remarks on the order of articulatory acquisitions in young children.

(143) Smee 1850:176; Pike 1864:cxcii. Wilks' description of the linguistic capacities of his parrot (Wilks 1879) may be a beautiful hoax: 'Poll ... has sentences at her command ... she can sing ... the bird invents names and the names gathered from a particular sound. Thus Poll's name for water is a sound produced by the running fluid ... The sight of a cat makes a parrot say "mew", as the sight of a train makes a child say "puff, puff."! (pp.155, 159).

(144) Upham 1843:418-423;Wedgwood 1866:140-141; Whately 1869:50-56.

(145) Hunt 1859:319-325.

(146) Op.cit.:321.

(147) Op.cit.:322.

(148) Op.cit.:324. An earlier work than Hunt's to touch on the connection between the brain and language was by the American writer Benjamin Taylor (1842). In its contents it anticipated Hunt. It contains material on, for example, the musculature of the face and larynx, some rudimentary phonetics, and includes a single sentence on the relationship between brain and language, which is left unexplained: 'The organ of the faculty of language is not the ear, but the Brain, as the Larynx and vocal tube are its instruments' (p.184).

(149) Whately 1869:74. The remark by Max Müller, in 1861, that 'language is more palpable than a fold of the brain or an angle of the skull' (Max Müller, F. 1861:361) suggests that he may have been aware of the then very topical discussions taking place amongst neurologists in France as to the question of cerebral localization. For an earlier reference to phrenology in relation to language, see Davis, S. 1843: 41-43, and the remarks on Knowles (1855), note (36) above.

(150) Hovelacque 1877.

(151) Op.cit.:23. Cf. also the remarks by Easton, quoted earlier, pp. 70 - 71.

(152) Sayce 1880:II,303.

(153) Max Müller, F. 1887:202.

(154) Byrne 1892:II,401. For other remarks on neurolinguistics, this time by psychologists, see Sully 1884:350 and McCosh 1886:201-203.

CHAPTER 2

NEUROLINGUISTIC STUDIES, 1793 - 1862

NOTES FOR CHAPTER 2 ARE BETWEEN
PAGES 185 AND 207

2.1 Introduction

2.1.1 Speech pathologies

As was pointed out in the Introduction, neurolinguistic studies in the British Isles did not suddenly come into being in the 1860s with the publication of Jackson's papers on 'loss of speech'. Between 1793 and 1862 a quantity of material on language and the brain was published in the contemporary medical (and non-medical)literature. (More precise details of the extent of this literature are given in sub-section 2.3.) Much of it was concerned with "aphasia", that is with language disturbances of supposedly cerebral origin. However, two other linguistic conditions attracted the attention of certain medical personnel and were discussed within the context of the state of knowledge obtaining at the time of how the brain functions: neurologically-based voice disorders and stammering.(1) Although in terms of the total published output on neurolinguistic matters, they come nowhere near displacing "aphasia" as the central topic of concern, they nevertheless serve to show that some clinicians at least were well aware of how much more than "aphasia" might be explained in terms of disturbances of neural processes.

In 1854, Romberg(2) complained that 'Too little attention has hitherto been paid to alterations of the voice in nervous diseases, especially in those of a nervous character'. Judged by the volume of work that had been published on "aphasia", his remarks were well justified, for only three British neurologists referred - at least in their published work - to specific cases of voice disorders: John Abercrombie, Charles Bell and Gordon Lefevre. Abercrombie noted that 'affections of the voice' may arise from injury to the upper part of the spine;(3) Bell discussed a handful of cases,(4) adding somewhat

disconsolately that they were 'odd cases, which we do not understand'; and Lefevre commented that if the nerve supply to the larynx became damaged, 'the voice becomes indistinct', and 'if the recurrent nerves were divided, it is altogether extinct'.(5)

Considerably more attention was devoted to the question of stammering, both by the medical profession and by a variety of amateurs who had been drawn to the study of the subject for a number of different reasons. In a recent study,(6) the general background to the study of stammering during the 19th century in Britain has been well described. From this it emerges that much of the literature of the subject was concerned with how a stammerer may be treated or, failing that, helped to come to terms with his or her problem. Consequently, many psychological, social and medical (even surgical) procedures were recommended. Little attention was paid, however, to the explanation of the condition in neurological terms. Of the few clinicians who did venture an opinion, however, the foremost was Marshall Hall.(7) He regarded stammering as an affection of the 'excito-motory system',(8) in which 'the act of volition is rendered imperfect by an action independent and subversive of the will, and of true spinal origin'.(9) The relative precision with which Hall located the source of the impediment in stammering may be compared with the more general remark made some years earlier by another neurologist C.H. Parry, who regarded stammering as being due to 'a mere convulsive affection of the nerves concerned in speech'.(10)

Forms of treatment for stammering used in the 19th century included surgery of the tongue and uvula, but no one went so far as to suggest any neuro-surgical procedures, such as trephining.(11)

2.2 The "aphasiologists"

2.2.1 General

Altogether 73 named authors and two medical clinics (in Edinburgh and London) published a total of 101 items on "aphasia".[12] The authors of the reports included a number of eminent figures in the field of British medical studies in the late 18th and 19th centuries, such as John Abercrombie (1781-1844), the Edinburgh physician and author of the first textbook in English on clinical neurology (Abercrombie 1828), John Abernethy (1764-1831), the London surgeon, Matthew Baillie (1761-1823), the anatomist and neuropathologist, Sir Charles Bell (1774-1842), one of the foremost surgeons of his day and a person who showed a particular interest in the study of the nervous system, Richard Bright (1789-1858), the London physician who gave his name to Bright's Disease, William Browne (1806-1895), later to be appointed to the most senior post in psychiatry in Scotland, that of Commissioner of Lunacy, and Marshall Hall (1790-1857), regarded as one of the foremost British neurologists of the first half of the 19th century. Alongside these famous names, however, should be set those who never achieved the same degree of fame within their profession, men like Daniel Gibson and James Bennett.

An important question must be whether there is any evidence that any one person or a group of people or a particular medical centre acted as a focus for the study of "aphasia". There can be no doubt that from 1816 onwards, Scottish doctors contributed a relatively large number of case-descriptions, and that this trend was reinforced from the mid 1820s (and intermittently during the 1830s) by the influence of the phrenological movement in Scotland, which resulted

in the publication of a number of cases of "aphasia".[13] Between the mid 1840s and 1862, however, the majority of "aphasia" studies emanated from clinics in London.

Two names stand out, however, in this period, those of John Abercrombie in Edinburgh and Jonathan Osborne in Dublin. Measured purely in terms of the number of case-descriptions of "aphasia" that he published, John Abercrombie was clearly a major contributor to the study of the subject, and, as will become evident in the course of this Chapter, his work deserves especial consideration because of the many insights he provided into the nature of "aphasia".

2.2.2 Jonathan Osborne

Osborne's work should be mentioned at this stage, firstly because it has remained almost unnoticed since the 19th century, and secondly, because he illustrates a particular approach to the description and explanation of aphasia that one associates more with the present century than with the last.

Jonathan Osborne (1795-1864), an Irish clinician and, from 1840 onwards, King's Professor of Pharmacy and Materia Medica in the School of Physic in Dublin,[14] read a paper to the Dublin Medical Society in November 1833 on four cases of "aphasia". The excellence of his exposition - indeed his whole approach to the question of "aphasia" - quickly won him the admiration of his contemporaries, and the paper, subsequently published, was to be referred to at intervals until virtually the end of the 19th century: it was held up as a model of how "aphasia" should be studied.[15]

The key to the excellence of his work lies not so much in his medical interpretation of the cases, but in his awareness of the need to set the study of "aphasia" into a wide perspective built up of ideas from three different disciplines: medicine, linguistics and psychology.(16) He deals in essence with seven topics.(17) He relates the linguistic behaviour of otherwise 'normal' speakers under conditions of fatigue to that of "aphasics"; he establishes a much wider semiotic framework for the description of "aphasia" than most of his predecessors, contemporaries or successors (see below); he looks for an explanation of "aphasia" in primarily psychological terms; he raises the question (and answers it) of differential performance in different modalities, specifically how an "aphasic" can often write better than he can speak; he gives a dispassionate account of the question of language localization; suggestions are made as to the prognosis in cases of "aphasia"; and, lastly, he discusses the role of speech therapy in the management of "aphasia".

Altogether, four cases of "aphasia" which had come under his care are described, but most of the paper is devoted to describing and discussing the behaviour of one particular patient. The emphasis, both in the paper and here in this discussion, is placed on theoretical issues, rather than on the actual results of the analysis.

Four major modalities are investigated: speech, writing, speech-comprehension and reading. Two different aspects of speech, namely spontaneous speech and speech when repeating utterances after another person, are mentioned. The deformation of speech is analysed in terms of 'letters' (examples of the patient's speech are given in orthographic transcript), and also, in the more obviously phonetic terms of syllables:

syllable-lengths of words, articulatory and co-articulatory difficulties within and between syllables.(18) In addition to a description of his patient's speech as he, Osborne, perceived it in the context of a consulting-room, mention is made of the effect that it had on other people: 'When he came to Dublin, his extraordinary jargon caused him to be treated as a foreigner, in the hotel where he stopped, and when he went to the college to see a friend, he was unable to express his wish to the gate porter, and succeeded only by pointing to the apartments which his friend had occupied'.(19) His comprehension of speech was 'proved in a variety of ways'.(20) His ability to write was tested by the obvious method of getting him to copy written material as well as by examining his spontaneously written forms. The results were checked over a period of time to assess any change in his condition, and subjected to a fairly simple, but hardly exhaustive, linguistic analysis: misordering of words, and the admixture of non-English words. Two forms of reading were assessed: reading silently and reading aloud.

Other aspects of the "aphasic's" behaviour that were commented on were his calculia, musical abilities, abilities in foreign languages - for example, he had no difficulty in translating from Latin and French into English - and, finally, the degree of self-awareness that he showed of his own situation.

Summarizing, one can say that Osborne, although by no means the first clinician to touch on these various semiotic features in the context of "aphasia", nevertheless showed that by adopting a three-pronged approach, involving ideas from medicine, linguistics and psychology, a picture of a particular "aphasic" patient could be built up that revealed the essential features of the condition.

For many years there was to be no other description of "aphasia" that approached Osborne's in quality of analysis.

2.3 The "aphasics"

2.3.1 Number of cases

The total number of "aphasics" whose symptoms were described in print was 291. The reports themselves appeared either as case-histories quoted in works on medicine or as individual items in the periodical literature. The first report (in a general work) appeared in 1793 (O'Halloran), and the first report devoted to an individual case in which particular emphasis was placed on the linguistic symptoms, was presented in 1806 by Matthew Baillie to a meeting of the London Medico-Chirurgical Society; it was not published, however, until 1813.

In Appendix A (pp.503 -541) will be found a complete chronological listing of all the case-reports and discussions of "aphasia" from 1793 to 1894. From this it can be seen that the subject continued to engage the attention of certain members of the medical profession throughout the period 1793-1862, but especially in the period 1809 to 1850. There appears to be no particular reason why this should have been so, although, as mentioned earlier, the interest shown by phrenologists in the question of language and "aphasia" and also the number of cases described by John Abercrombie tended to generate an interest in the subject.

2.3.2 Geographical provenance of the cases

The patients were drawn from medical practices, both in hospitals and elsewhere, across a wide geographical area of the British Isles,

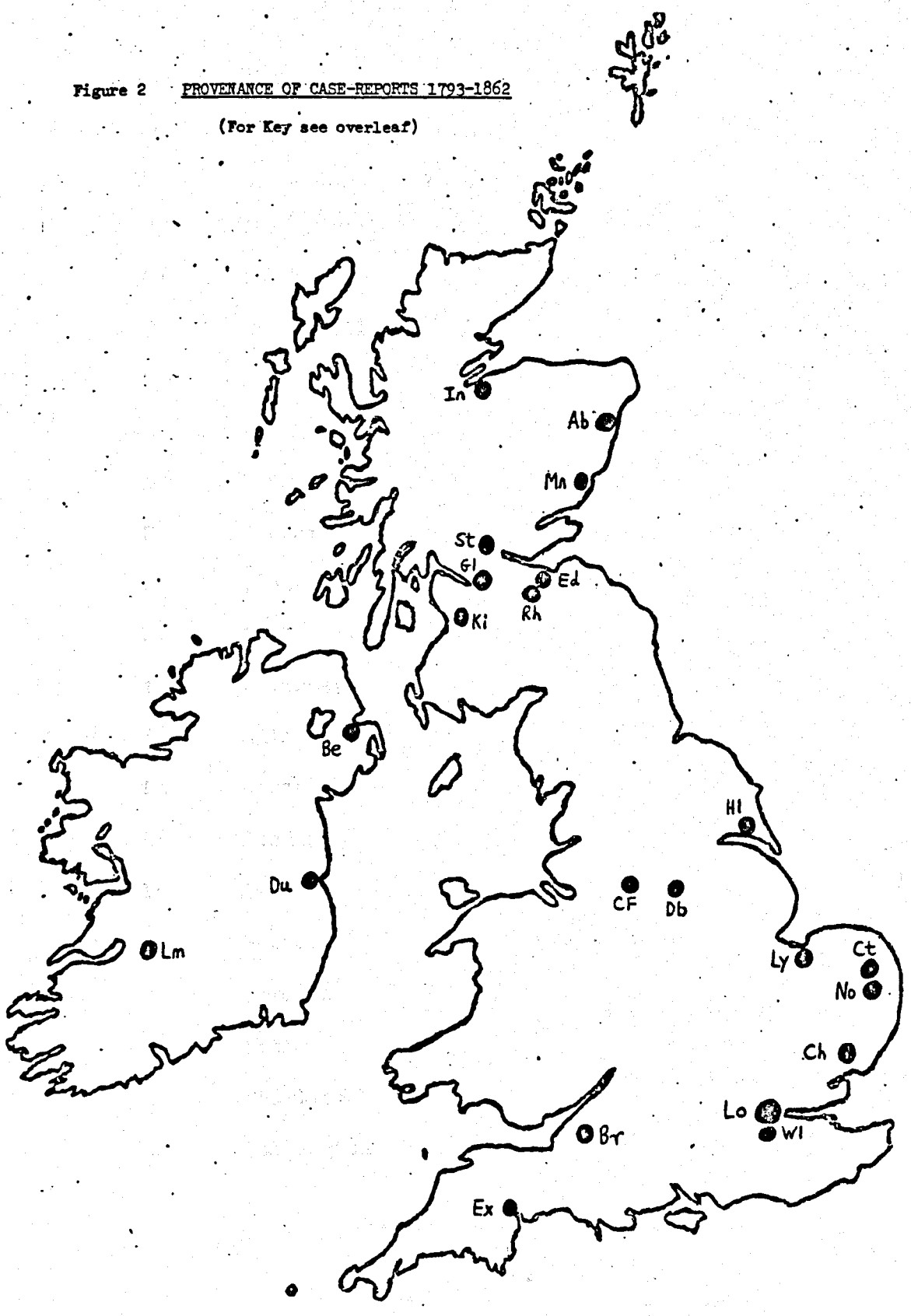
with a preponderance of cases being reported from three major medical teaching centres, London, Edinburgh and Dublin.(21) Indeed, on the admittedly small amount of evidence available, it does seem that there was no epidemiological pattern in the distribution of the cases: "aphasia" might occur virtually anywhere in the British Isles. This can best be judged from Figure 2. In addition, cases were reported from outside the British Isles: from various parts of Europe and from Philadelphia,(22) as well as from the Army and Navy.(23)

2.3.3 Ages

There were so few cases of "aphasia" in relation to the population of any one part of the British Isles at any one time during the period from 1793 to 1862 that it is impossible to determine with accuracy the ages at which "aphasia" was likely to occur. However, a rough indicator of the incidence of "aphasia" in relation to age can be seen in Figure 3. Aggregates of the ages of patients over ten-year periods have been plotted as percentages against the number of cases in which the ages of the patients are given. From this, it will be seen that the peak period for males lay between ages 40 and 70 (that is, in real terms, between 31 and 69, since the end-point of the ten-year period has been treated as the representative for the decade as a whole). In the case of females, however, the peak was reached much earlier and then fell sharply, rising only in the 60 to 70 age-group. One reason for the difference is undoubtedly the number of cases of 'hysterical' "aphasia" reported amongst teenage females.(24) Later, in Chapter 4, it will be seen that an interesting parallel exists between the results of a statistical analysis of this sort and that for the period 1864-1894.(25)

Figure 2 PROVENANCE OF CASE-REPORTS 1793-1862

(For Key see overleaf)

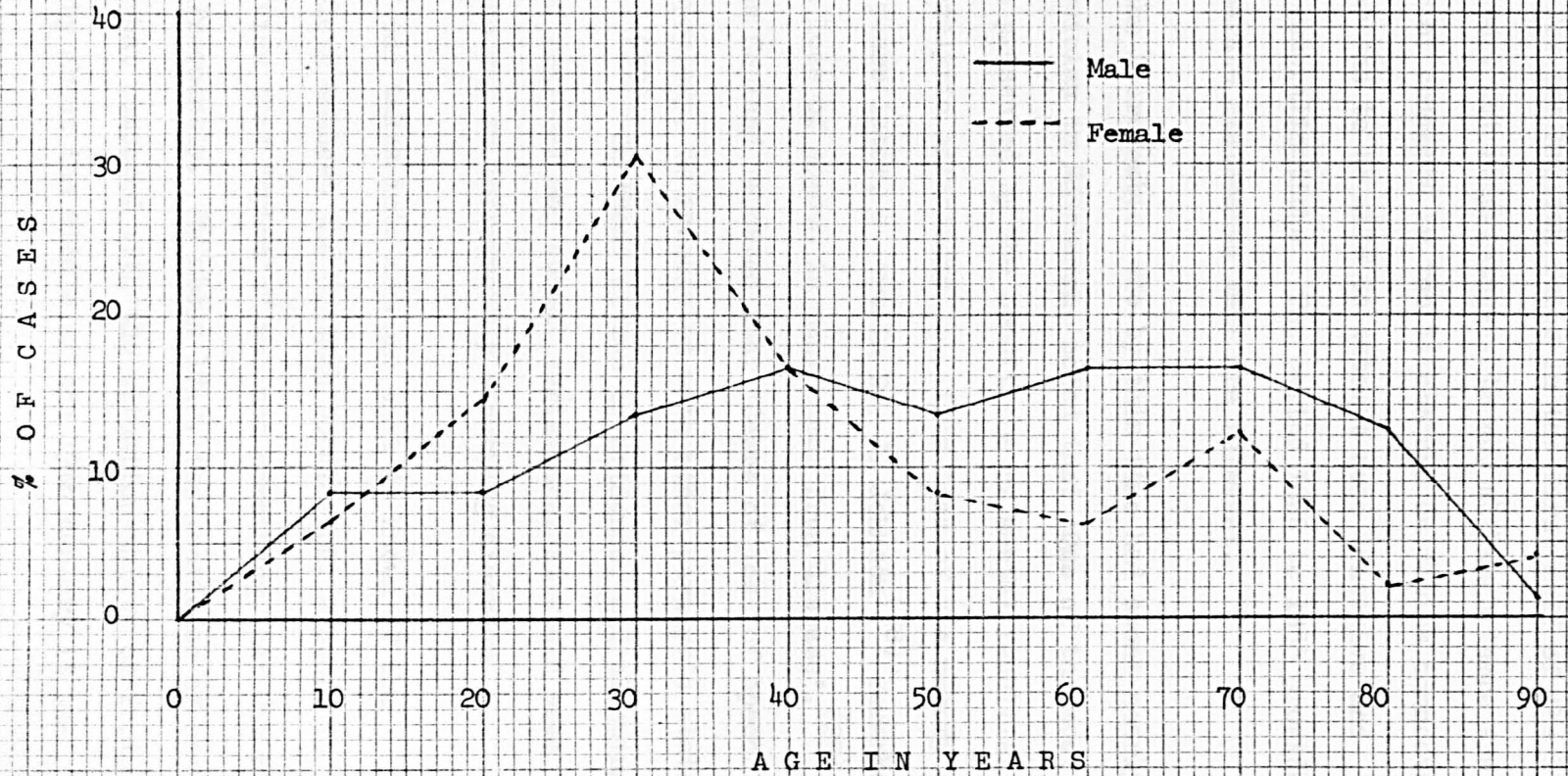


KEY

Ab	Aberdeen
Be	Belfast
Br	Bristol
CF	Chapel-en-le-Frith
Ch	Colchester
Ct	Coltishall
Db	Derby
Du	Dublin
Ed	Edinburgh
Ex	Exeter
Gl	Glasgow
Hl	Hull
In	Inverness
Ki	Kilmarnock
Lm	Limerick
Lo	London
Ly	Lynn
Mn	Montrose
No	Norwich
Rh	Ratho
St	Stirling
Wl	Wallington

Figure 3

INCIDENCE OF "APHASIA" ACCORDING TO AGE IN THE CASE-REPORTS 1793-1862



2.3.4 Incidence of "aphasia" in the population

It has recently been pointed out that from amongst 200,000 stroke cases in the English-speaking population of North America each year, about a quarter involve a degree of aphasia.(26) Can one make a similar estimate for the British Isles in the first half of the 19th century? The answer, not surprisingly, is no, although there are a sufficient number of comments in the literature on topics connected with "aphasia" for one to be able to attempt some tentative and inevitably broad generalizations. The period 1828 to 1858 provides us with three separate statements that are relevant.

In 1828, John Abercrombie, who by this time had spent nearly 30 years as a physician in Edinburgh, noted that 'One of the most common phenomena presented by the conditions of mental faculties, connected with paralytic affections ... is a loss of the memory of words'.(27) Ten years later, a certain Dr. J. Johnson(28) remarked that 'he had seen loss of speech in many cases from disease'.(29) And in 1858, James Copland reported that 'Cases of loss of speech consequent upon apoplexy, or associated with other paralytic states, are very frequent'.(30) On these pieces of evidence, and allowing for the possibility of regional and social variations, it would seem that "aphasia" was in no way an infrequently occurring disorder.

Further, if one takes into account what is known of the incidence of apoplexy amongst the British population, support is obtained for the view that "aphasia" was not something that was met with only very infrequently. By about 1812, the incidence of apoplexy had declined somewhat compared with the situation thirty or forty years earlier,(31) but by about the middle of the 19th century it was

apparently rising: one physician regarded it as a 'disease of so frequent occurrence'.(32)

Two further 'statistical' summaries underline the fact that "aphasia" was not by any means a rare phenomenon. In 1853, Goolden wrote of 'how cerebral disease forms a very large proportion in the aggregate of internal affections which are treated in public institutions' and of how from amongst a 'great many cases of hemiplegia ... a pretty large proportion ... lose the faculty of articulation either partially or entirely'.(33) And of the 246 cases of apoplexy recounted by Copeman - and almost all of them had been culled from the medical literature from the late 18th century onwards, British as well as Continental - 40 (or a little over 16% of the total) showed symptoms of "language" disturbance.(34)

An attempt to calculate the incidence of "aphasia" on the basis of comparative data from other countries has not proved successful. Although more statistical surveys were carried out there into the incidence of speech disorders in general than in the British Isles, very little of significance emerges.(35)

2.3.5 Social backgrounds of "aphasics"

The case-reports provide evidence that "aphasia" was not by any means restricted to any one particular socio-economic grouping within the British Isles. It seemed that the condition could affect virtually anyone, from any walk of life: from the nobility, clergy, barristers to farmers, carpenters and labourers.(36) Indeed, the comment by Sayle(36a) that the typical "aphasic" would be 'elderly, anaemic, of a lean spare habit of body' and with a 'debilitating' lifestyle, was

patently incorrect - at least in the light of all the case-reports, not just Sayle's.

2.3.6 Causes of "aphasia"

A wide spectrum of factors that led directly or indirectly to the onset of "aphasia" are described in the case-reports.(37) From these it is possible to establish four categories of precipitating agent of "aphasia": (a) physical condition(s) of the brain; (b) psychological/psychiatric factors; (c) non-neurological conditions; and (d) miscellaneous (i.e. non-specifiable) factors. A more delicate classificatory system might be used: for example, a distinction could be drawn between damage that results from the action of an agent external to the contents of the cranium (a fracture of the skull, for example), or one that is internal (a vascular accident, for example). And at an even more refined level of classification, one might distinguish between factors which produce an instantaneous or near-instantaneous effect (such as a gun-shot wound to the head) and those that have a more delayed effect (such as the progress of typhoid fever). However, rather than sub-classify needlessly, the various forms of trauma, apoplexy and so on, have been listed separately, using the terminology of the case-reports themselves.(38)

One category of precipitating agent requires further comment, and that is traumatic injury received on a battle-field. Neither John Hunter's classic work A Treatise on Blood, Inflammation, and Gun-Shot Wounds (1794) nor Charles Bell's A Dissertation on Gun-Shot Wounds (1814) mentions "aphasia" as a possible sequela to head-injuries. Much later in the century, Bateman was to note that 'The annals of

military surgery are rich in instances of traumatic aphasia, the result of gunshot wounds of the head, but the impairment of language is only mentioned as it were en passant'.(39) How frequently, then, did such cases of traumatic "aphasia" occur? In 1778, Dease had described nine cases,(40) and in France the subject of traumatic "aphasia" had received a certain amount of attention;(41) yet no comparable study was ever undertaken in the British Isles. Perhaps traumatic "aphasics" from the battlefields rarely survived their injuries, although in view of the French experience this would seem an unlikely explanation. Alternatively, the doctors responsible for their care may have seen no reason to report cases of traumatic "aphasia" in the literature. Nevertheless, one cannot help but remark that the lack of traumatic cases is surprising, especially since British troops were either involved in military campaigns or else were garrisoned in many parts of the world during the period 1793 to 1862 (including North America, Europe, Africa and the Far East). In addition, at least three contributors to the literature on "aphasia" acted as field-doctors in some of the campaigns of the Napoleonic War: Charles Bell after Corunna and Waterloo,(42) Richard Bright after Waterloo,(43) and Samuel Broughton, himself a full-time Army surgeon, during the Peninsular Campaign and at Waterloo.(44) The only case of traumatic "aphasia" from war wounds that was published was by Hennen. He described the speech problems of a British captain who suffered a head-injury at Waterloo.(45)

2.4 Language and language disturbances

2.4.1 The concept of 'language' in the case-reports

The question of the nature of language and how it may be analysed hardly ever arose as a topic for specific discussion in the case-reports of "aphasia" - at least until the 1860s. To this extent, the situation was comparable to that to be found in the general neurological texts of the period.(46) It must be assumed, therefore, that the authors believed that their readers would be familiar with the concept of 'language' from their general intellectual background and consequently would have had no difficulty in following the lines of argument presented in the reports themselves. And yet this assumption is occasionally belied when one finds doctors giving a definition (usually of their own making) of the word 'language' (and sometimes of 'speech' too) - see below. From this one may perhaps conclude that an element of doubt existed amongst the medical profession as to what language really was, and that some preliminary explanation was deemed to be advisable to allay any unease that was felt about the meaning of 'language'. At the same time, it may well have reflected a divergence of opinion amongst doctors about the nature of language, with individual doctors using the term in a specific manner. In any case, it would have been logical to have defined key-words such as 'language' and 'speech' before any attempt was made to explicate concepts such as 'affection of language' or 'loss of speech'.

In the preambles to the case-reports in which definitions are offered of 'language' etc., one notices a lack of any agreement on such a fundamental issue. Thus, Steele defined 'language' as 'a certain system of vocal sounds by means of which the members of any

definite society of individuals convey to each other their mental conceptions',[47] echoing word for word the definition in the English translation of Johannes Müller's textbook of physiology.[48] This conception of language having to do primarily with sounds (not the total process whereby thoughts are transformed into sounds) is found again a few years later in another definition, by Kirkes and Paget: language is 'the combination of ... sounds into different groups to designate objects, properties, actions, etc.'.[49] Robert Dunn, on the other hand, placed stress on the purely psychological and philosophical aspects of language: for him, language was 'an intellectual instrument between perception and thought'.[50] This wording actually reflects the growing emphasis on the psychological conception of language, at the expense of the purely phonetic, towards the end of the 1793-1862 period. Thus, says Dunn, 'Words are the pabulum of thought';[51] 'grammar is at the root of all languages' announces Laycock.[52]

Two points of importance emerge from the above. Firstly, the differing approaches to the question of the nature of language paralleled the situation to be found in the literatures of linguistics and psychology.[53] Secondly, there is no evidence that the views of linguists or psychologists influenced the thinking of doctors involved in the study of "aphasia". And thirdly, the lack of any discussion, let alone agreement, on the question of language was contributing to a feeling of certainty about language amongst doctors, when in actual fact there had been scarcely any consideration of so fundamental a question. In effect, a theoretical structure for neurolinguistics was being erected without any serious preliminary discussion of one of

its most important components. The effects of this were to be recognised consciously only during the second half of the 1860s.(54)

2.4.2 'Linguistic' descriptions of "aphasic" speech

2.4.2.1 General

With only a few exceptions, no attempts were made to describe the "language" of "aphasics" in linguistic terms. Instead, a very general and often incomplete picture was painted of the difficulties experienced by the patients. Thus, what amount in almost all cases to impressionistic characterisations of the speech and other modalities give little more than a brief indication of the degree of severity of the linguistic breakdown; they rarely convey precise information as to what the person's speech was really like.(55) Nevertheless, an examination of the descriptors that were used to summarize the patients' conditions shows, on the one hand, that a more obviously 'linguistic' orientation in the description of "language" was required; and, on the other, the types of answers that clinicians were giving to the inevitable question of what had given rise to the "aphasia".

A clear distinction reveals itself between those 'linguistic' descriptions that try to characterise the patient's speech in terms of its auditory features (for example, 'much incoherent talking') and those which label the cause of it (for example, 'forgetfulness of words'). One might consider such a distinction to be that between an auditory description and a psycholinguistic explanation.(56)

Figure 4 sets out the modes of description (the descriptors) used by the authors of the case-reports on a 4-point scale of severity. At one end one finds a term such as 'a senseless succession of words';

Figure 4

DESCRIPTORS OF PATHOLOGICAL "LANGUAGE"

← More Severe — Less severe →

unintelligible (Abercrombie 1828:251, 264)	almost unintelligible (Cross 1816:122)	impeded (Edinburgh University Clinic 1830:497; Dunn 1862: 571)	muttering (Abercrombie 1828:234)
nonsense (Crichton 1798: 376)	very inarticulate (Abercrombie 1818b:557; idem 1828:261)	impaired (Abercrombie 1828: 242)	slightly impeded (Broughton 1827:414)
much incoherent talking (Abercrombie 1818a:327)	considerably incoherent (Abercrombie 1845:76)	inarticulate (Abercrombie 1819b:498;idem 1828:92; Gibson,W. 1836:516; Watson,T. 1843:480)	imperfections (Edinburgh University Clinic 1830: 497; Watson,T. 1843:473; Ogle,J.W. 1859:320; Abercrombie 1845:267)
senseless succession of words (Good 1834:476)	incoherent (Abercrombie 1818b:560,563; Hood 1824: 236; Nicol 1826:617)	faltering (Heberden 1806:159; Watson,T. 1843:480)	hesitations (O'Halloran 1793:280)
speechless (Abercrombie 1819b:504; Abercrombie 1828:78; Ryan 1823:203; Jackson, S. 1829:332)	very imperfect (Abercrombie 1828:260)	considerable hesitations (Abercrombie 1828:57)	partially inarticulate (Abercrombie 1828:401)
complete dumbness (Sedillot 1856:516)	very difficult (Abercrombie 1819b:499)	indistinct (Abercrombie 1818b:555; idem 1819a:13; idem 1819b:505; idem 1828:157, 274)	
utter loss of the knowledge of language and letters (Heberden 1806:348)	indistinct and somewhat incoherent (Broughton 1827:413)	embarrassment of speech (Abercrombie 1828:270)	
gibberish (Brodie 1854: 55)	very imperfect and indistinct (Powell 1815:230)	indistinct and inarticulate (Abercrombie 1819b:498)	
words strangely jumbled together (Gibson, W. 1836:515)	very indistinct (Abercrombie 1828:260; Bennett, J.R. 1849:157)	indistinct or difficult (Abercrombie 1818a:271)	
	incoherent and inarticulate (Abercrombie 1828:257)	difficult (Abercrombie 1828:332)	
		thick(57) (Baillie 1813:9; Abercrombie 1828:401)	

at the other, a term such as 'partially inarticulate'. Between these two extremes a wide range of descriptors can be placed. Since one cannot know exactly what individual authors meant by the term 'partially inarticulate' (no actual phonetic transcriptions are given), the scale of severity has been divided into only 4 points on the basis of a set of values ranging from severe to mild through the two intermediate degrees of moderately severe and minimal.

2.4.2.2 Phonetic descriptions

In a small number of case-reports one finds some phonetic terminology being employed. Abercrombie notes the 'unusual slowness' of speech,(58) and another author tries to describe the condition of his patient more objectively by saying that he began to 'stammer'.(59) But it was the paper by Peter Duncan, physician to the Essex and Colchester Hospital,(60) that was the first to use phonetic terminology in such a way that a reader of the report, conversant with phonetics, would gain a clear impression of what exactly the patient's speech was like. He described it thus: '... the tongue is protruded, retracted, and moved in every direction with the greatest facility, but whenever she attempts to utter a syllable, however simple, its tip is forcibly directed against the fore-part of the palate, is retained there but for an instant, and as rapidly returns; her language is, therefore, a succession of "d's" and vowels ... any polysyllable is a jumble of d's and vowels. She can pronounce neither gutturals nor sibilants ... Words beginning with a hard "c or k", as "could, cork, kiss," which require the back part of the tongue to be impinged for an instant against the corresponding part of the palate, could not be pronounced by my patient'.(61)

Despite the fact that here one had a clear case of phonetic terminology being used to produce a more objective and meaningful characterisation of the "aphasic's" speech, a considerable gap existed in general between the potential for phonetic descriptions (as described in Chapter 1)[62] and the actual use that was made of it by doctors in their case-reporting.

2.4.2.3 Grammatical descriptions

Grammatical terminology is employed occasionally by some authors. Abercrombie, discussing the linguistic symptoms associated with paralytic affections, notes that in certain cases the 'loss of the memory of words' is 'sometimes ... confined to words of a particular class, as nouns, verbs, or adjectives'.[64] Shapter indicates that his patient had a problem of syntax: in the 'faculty of properly arranging and constructing ... sentences'.[65]

As with the relative neglect of phonetic principles in the description of "aphasic" speech, so in the case of the explicit use of grammatical terminology, one sees further evidence of the virtual ignoring by doctors of the fund of information available to them on the grammatical description of speech.

2.4.2.4 Osborne's descriptions

The paper by Osborne (1834) deserves to be quoted more extensively as it is virtually the only one of the entire set (between 1793 and 1862) which reveals an awareness on the author's part of exemplifying and analysing the patient's problems in linguistic terms instead of trying to sum them all up in some short phrase:[66] '... we find the most common failure of memory amongst nouns ... but [he] could only

say, bon te utt and a few other monosyllables, but no words of more syllables ... in repeating the letters of the alphabet, he could never pronounce k,q,u,v,w,x, and z ... he articulated very difficult and unusual syllables ... children always continue to use regular forms for irregular nouns and verbs, until better instructed by exercise and observation'.(67)

2.4.3 'Psycholinguistic' explanations of "aphasic" speech

Various 'psycholinguistic'(68) explanations were put forward for the patients' linguistic behaviour. Most fall into two broad, but overlapping categories, the one exclusively psychological (A), the other a mixture of physiological and psychological features (B). They are set out in Figure 5 .

It will be seen that two key-terms recur, memory and power, but nowhere is any attempt made to explain in more detail what they actually involve. Clearly, it was assumed that a degree of shared knowledge existed about their implications. And, of course, one can see a parallel here to the situation vis-à-vis the definition of the word 'language': a way of looking at and trying to explain the nature of "aphasia" was being proposed before the principles of that approach had been determined beforehand. (The question of models of speech production, which was recognised by a small number of clinicians as impinging on any attempts to rationalize the study of "aphasia", are dealt with below, sub-section 2.5.)

Figure 5

PSYCHOLOGICAL AND PHYSIOLOGICAL-PSYCHOLOGICAL EXPLANATIONS OF "APHASIA"

A. Psychological

1.	Impaired intellects	(O'Halloran 1793:140)
2.	Loss of recollection	(Abercrombie 1818a:299; Hood 1826:27; Abercrombie 1828:242; 1818b:555)
3.	Loss of recollection of words	(Baillie 1813:9)
4.	Loss of the memory of words	(Abercrombie 1828:260)
5.	Forgetfulness of words	(Edinburgh University Clinic 1830:497)
6.	Forgetfulness of names	(Crichton 1798:I,368)
7.	Vocabulary forgotten	(Good 1834:476)
8.	Forgetfulness of recent ideas	(Watson, R. 1818:I,10)
9.	Very singular deficiency in memory	(Anon. 1829:356)
10.	Almost total loss of the memory of language	(Shapter 1837:314)
11.	Failures of memory	(Osborne 1834:158)
12.	Faculty of memory very imperfect	(Goolden 1853:78)

B. Physiological and Psychological /...

B. Physiological and Psychological

1.	Loss of sense and speech	(O'Halloran 1793:194)
2.	Loss of speech	(Abercrombie 1818b:15; 1819a:1; 1819b:503; 1828:83 et passim; Ryan 1823:203; Abercrombie 1845:268; Sayle 1845:63)
3.	Perfect loss of speech	(Abercrombie 1828:272)
4.	Complete loss of speech	(Goolden 1853:78)
5.	Loss of articulate speech	(Dunn 1862:571)
6.	Loss of the power of speech	(Powell 1815:216); Westminster Medical Society 1838:307)
7.	Power of utterance extinguished	(Sayle 1845:63)
8.	Deprivation of powers of speech	(Westminster Medical Society 1838:307; cf. also Watson, J.A.D. 1815:304)
9.	Deprivation of power to pronounce articulate language	(Craig, J. 1836:338)
10.	Interruption to powers of expression	(Cheyne 1843:91)
11.	Loss of all power of uttering the most simple articulate sound	(Copland 1850:37)

2.4.4 Writing disturbances

In 1806, William Heberden (the Elder) had pointed out that writing as well as 'voice' may be affected in cases of brain-damage,(69) yet of the case-reports only sixteen make any reference to a disturbance of writing. This may simply reflect the fact that the majority of "aphasics" had no problems with writing - although in the light of 20th century studies of "aphasia" this would seem highly unlikely - or else that the clinicians were unaware of the fact that writing may be impaired in such circumstances.(70) In four of the sixteen, there was no disturbance of writing (or only under certain circumstances), and this suggests that clinicians were well aware of the possibility of writing being affected as much as speech.(71) In another case, the patient was 'able to write coherently, and with perfect lucidity, whatever he wished to communicate to others', yet his 'conversation was unintelligible'.(72)

In six cases we are not told why the person was unable to write, only that he or she was 'obliged', as Abercrombie put it, 'to relinquish the attempt'.(73) In one other case(74) we are told that the person was 'unable to recal [sic] words'; in another (the case of Abercrombie, quoted above), that the patient could neither 'make sense nor spell'.

However, an examination and comparison of the remaining reports reveals a variety of different problems connected with writing. The actual marks on the paper might be 'scarcely legible ... and the lines ... very crooked'.(75) If the writing itself was legible, the words (or at least some of them) might be out of order.(76) Alternatively, the words had to be interpreted with their opposite meanings. Winslow quotes a case of a woman who was 'able to communicate in writing her

wishes. When doing so, however, she invariably wrote no when she meant yes, and vice versa. When she wrote "I wish you to do so", it was construed conversely'.(77) Yet another possibility was that the written product might be quite unintelligible: Stephen Jackson has an example of his patient writing 'Didoes doe the doe'.(78) In only one case is there evidence that the errors of speech were mirrored exactly in the person's writing. Crichton(79) quotes a case of a German whose 'writing is equally wrong with what he speaks ... The words he writes are those he speaks, and they are always written conformably to his manner of pronouncing them'.

2.4.5 Speech-comprehension disturbances

2.4.5.1 Wernicke's predecessors

In 1874, Carl Wernicke published his first paper on aphasia, one that was to exert a seminal influence on the development of work in this field, more particularly on the Continent than in the British Isles, for a number of years.(80) In it he described the condition to be known later as sensory aphasia or, eponymously, as Wernicke's aphasia. However, he was not the first clinician to point out that a disturbance of speech-comprehension can be a feature of some types of aphasia. Bastian(81) claimed that he had preceded Wernicke to this conclusion in a paper published in January 1869: there is no doubt that he had. Thus, describing the condition of a young woman at the National Hospital in London, he says: 'She could not be made to understand at once, by words alone, what was required of her ... she seemed not to be able to understand the meaning of words. They had to be spoken very slowly, and repeated several times before she could catch their meaning, and she most frequently failed completely in this'.(82) The entire quotation

in the original is set in italics as if to draw particular attention to it, but, curiously, Bastian makes no attempt to explain why this should be so. Perhaps even more surprising, however, is that a few months later (April 1869) he was stating that 'in Aphasia ... the individual is able to think and understand what is said to him'.(83) This statement he later qualified by pointing out that 'Most aphasic patients can understand perfectly what is said to them' (italics, Bastian), and, furthermore, indicated that his colleagues in London and Glasgow, Bazire and Gairdner, had previously touched on the question of a disturbance of speech-comprehension in aphasia. Who, then, can be said to have been the first to have recognized the possibility of a sensory loss in aphasia?

There is ample evidence to show that some clinicians as early as 1812 (in the British Isles) had recognized the existence of a disturbance of speech-comprehension in certain "aphasics". Working backwards from the time of Bastian (1869b), the situation is as follows. Geschwind(84) and Eggert(85) mention only the work of Bastian (1869b) and Schmidt (1871); the latter was a German doctor. Kertesz,(86) following Meyer,(87) points to a paper by Meynert (1866) as the origin of the concept of sensory aphasia. However, one may assume that Baillarger, in a paper read to the Académie de Médecine in June and July 1865,(88) was hinting at the possibility of receptive aphasia. In the course of discussing the auditory problems experienced by some aphasics, he considered that two causes could be held to be responsible: a physical hearing loss and, secondly, what he called 'aliénation mentale'. The latter, although admittedly open to different interpretations,(89) would seem to encompass the concept of sensory aphasia as later elaborated by Bastian, Schmidt, Gogol and Wernicke.(90)

However, to pursue the question of precedence in the original description of sensory aphasia as if someone suddenly had made the discovery is illusory. In the British literature - and, one suspects, in the pre-1860 Continental literature too - there is considerable evidence to show that many clinicians had either instinctively expected that sensory aphasia could exist, or had actually come across cases of it. The relevant evidence in favour of this view is as follows.

In many case-reports, the aphasic's abilities to comprehend speech are mentioned. In the majority, the comment is merely to the effect that the person either understood perfectly what was said to him, or seemed to be able to. Brodie epitomizes this feature with his remark that one of his patients 'understood perfectly what was said to him'.(91) The phrase 'appeared to understand what was said to him/her' runs, like a stereotype, through many of the case-reports.(92) There can be little doubt, then, that the possibility of a disturbance of speech-comprehension was something that clinicians were naturally bearing in mind in their general assessment of their patients.

The evidence that certain British clinicians had actually come across examples, which they had described in print, of cases of sensory aphasia before Bastian's paper of 1869 is set out in the following quotations.(93) (They are given in reverse chronological order):

1. 'It cannot be distinctly affirmed that she has clearly understood anything spoken to her, except in so far as the general sense is apparent to her through surrounding circumstances' (Gairdner et al. 1875:568.) [A quotation from a case-note taken on 13 November 1868, well over a month before Bastian's paper, 1869b.]

2. 'He ... seems to understand things and people, excepting occasionally ... he seems at times as if he was deaf' (Ogle, J.W. 1867:82).

3. [An autopathographical account of aphasia] 'At this time I understood what others said, but taking the words of every clause collectively; but when I attempted to analyse it into its constituent words, I utterly failed' (Bramwell, J.P. 1867:181).

4. '... a word which in the normal state would be a familiar one, will be caught up and repeated mechanically, without any trace or shade of meaning being attached to it' (Gairdner 1865-68 :98).

5. 'The gentleman ... could not be made to understand the name of an object if it was spoken to him, but understood it perfectly when it was written' (Abercrombie 1830:151).

6. 'He did not seem to comprehend what was said to him' (Abercrombie 1828:234).

7. '... did not seem to understand any questions which were put to him' (Powell 1815:230).

8. 'He ... seems very imperfectly to understand what is said' (Cheyne 1812:126).(94)

2.4.5.2 'Cheyne's aphasia'?

Should the eponym 'Wernicke's aphasia' be altered to 'Cheyne's aphasia', in the same way that one of the obituaries of Bastian had been adamant that 'Wernicke's aphasia' should be replaced by 'Bastian's aphasia'?(95) There are a number of reasons why, in my opinion, the term 'Wernicke's aphasia' should remain. Wernicke had not only recognized the existence in certain cases of sensory aphasia, but, furthermore - and for this reason the term 'Wernicke's aphasia' is used - had noticed that in such cases the loss of expressive linguistic ability was of a different type from that in cases which were more obviously forms of aphasia in which the ability to understand speech was impaired. He had also determined the lesion causing the sensory deficit. Bastian certainly said nothing about the type of speech used by sensory aphasics; nor did he say anything about localization. In fact, of the cases quoted above to show that a sensory loss had been recognized to exist before Bastian's time, only one can be said to approach the true concept of 'Wernicke's aphasia': that described by Abercrombie in 1828. The patient was a 55 year-old man, who, six months after recovering from a hemiplegia, had experienced giddiness and sickness. This led directly to 'muttering and frequent attempts to speak' as well as to the disturbance of speech-comprehension.(96) The 'frequent attempts to speak' may represent something like the speech to be found in cases of 'Wernicke's aphasia'. The post-mortem, however, found nothing comparable to damage in the temporal lobe - the area that Wernicke had localized as the seat of the damage. Instead, there was serum in the lateral ventricles, blood in the 3rd and 4th ventricles, and extensive ossification of the arteries.(97)

In the case reported by Powell, the patient, apart from the disturbance of speech-comprehension, had a 'very imperfect and indistinct articulation'.(98) There was, however, specific damage to the cortex - perhaps even to the temporal lobe. The gyri were found to be flattened, and the 'anterior part of the middle lobe' was softened; the pia was 'much thickened', and a 'quantity of small white tubercles were found attached to it'. Could the 'anterior part of the middle lobe' be, approximately, the superior section of the temporal gyri? In the absence of both a diagram of the patient's brain and also any clear indication of what Powell meant by the 'anterior part of the middle lobe' one cannot really speculate further. But if he intended the temporal gyri, then he anticipated Wernicke's localization of the lesion of sensory aphasia.

The only comment in the post-mortem examination of Cheyne's patient was that the 'substance of the brain' was found to be 'unusually soft'.

2.4.6 Reading disturbances

In six case-reports, a disturbance of the ability to read is mentioned, but in most of them there is nothing beyond a bald statement that the person 'could not read'.(99) One case appears to have been so severe (although ultimately it was cured) that the patient could not 'even be made to comprehend the letters of the alphabet'.(100)

2.4.7 Gestural disturbances

Little is said about the affect that the brain damage had on gesture, although three clinicians did comment on it: in all three cases it was completely unaffected.(101)

2.4.8 Bi- and multi-lingualism

Thus far, we have considered only cases of "aphasia" in English. The question was raised during this period, however, of how bilinguals and multilinguals operated under conditions of brain-damage; it received a certain amount of attention in the medical press. Altogether, eleven authors discussed eighteen cases.(102) The years 1829 to 1837 were particularly fruitful as far as the description and discussion of the question was concerned.

Essentially three different types of brain-damaged patient were discussed: (i) those who, prior to the "aphasia", were considered to be bilingual in the sense of having native abilities in two languages; (ii) those who had a good, but not necessarily native-like, ability in other languages; and (iii) those who were competent in one or more dead languages. The twelve languages to which reference is made in these case-reports are: Breton, English, French, German, Classical Greek, Classical Hebrew, Italian, Classical Latin, Polish, Scots Gaelic, Spanish and Welsh.

Naturally enough, clinicians were curious to know whether the brain-damage affected the second language in exactly the same way as it affected the first. A whole variety of intriguing and apparently contradictory results were presented. Thus, some cases showed that the first language to be acquired was the one that was used as soon as communication became possible following the illness and, indeed, appeared to have been least affected. But the complete or partial reverse of this was also noted. Abernethy, for example,(103) found that a French patient of his, who was also fluent in English, could, after the illness, understand English perfectly well but was compelled

to use French when answering questions put to him. (Whether he could understand French or reply to questions in English is not stated.) Perhaps more remarkable still was a case of a man who, though bilingual in French (his first language) and English but had not spoken a word of French for 30 years, nevertheless used only French after the illness; his English had been completely lost.(104) Cheyne(105) had an English / French bilingual who answered questions only in French. One of Abercrombie's patients, a German/English speaker reverted, however, to German alone after the illness.(106) Another patient, a Welsh/English speaker, also reverted to her first language.(107) A similar, but not identical, case was that of an English speaker who in a 'state of delirium' appeared to speak in Welsh. It was subsequently discovered that the language was, in fact, Breton, the language spoken by her childhood nurse.(108) (Nothing is said, however, about whether the woman had been a fluent speaker of Breton in her childhood or had simply picked up some of the language.) The case was quoted to illustrate how memories, presumably long-forgotten, may, under certain conditions, be revived.

Instances of the opposite situation, however, namely the retention of languages acquired or learned(109) after the first language, are rather more frequent in these reports. A Pole, who subsequently learned German, Latin, and Greek, was less affected in German and Latin than in his first language, Polish; his knowledge of Greek on the other hand, was lost completely.(110) An English speaker, competent in Classical Greek, could recite correctly long passages from Homer during the period of a fever,(111) but on recovery was quite unable to repeat the exercise.(112) Another English speaker, however, became incompetent

in English but could, nevertheless, 'communicate' in Classical Hebrew, the last language he had learned.(113) Another case(114) noted how one particular English speaker was totally deprived of the ability to communicate in English, but fully understood and, indeed, spoke in Classical Latin. An English/French bilingual, who normally used only English in her conversation, lost the use of English for a month whereas her French remained completely unaffected.(115) Another English speaker, however, who was also competent (but not necessarily fluent) in French, Italian, German and Classical Latin, found that after his illness his comprehension of French and Classical Latin remained unaffected,(116) but his English, when he was reading a written passage aloud, became interspersed with German words such as AM and DES.(117) A similar, but not identical, case to this was that of an English speaker, an 'accomplished linguist', who was fluent in French, Italian, Classical Latin and Spanish, and who, after the illness, was more affected in his English than his French, Italian and Spanish; yet he had particular problems with nouns and proper names in French and Latin.(118) Another patient, a well-educated Italian, who was also multilingual, suffered severe problems with his English.(119) A German/English patient would use German (his first language) to 'express complex ideas' but English for simpler ones'.(120)

It is not possible, given the often sparse details of each case, to attempt a more searching analysis of the effects of brain-damage on bi- and multi-lingual speakers. In summary, therefore, one may say that the various case-reports reveal two broad, but conflicting, patterns of the differential breakdown of different languages in cases of "aphasia": one pattern anticipates Ribot's Law,(121) the other is clearly in direct conflict with it.

2.4.9 Calculia

The differing effect that brain damage could have on a person's ability to perform mathematical calculations was noted in only four reports. Osborne[122] and Grattan[123] found that the ability was unaffected, whereas in Steele's patient,[124] the reverse was the case: 'His powers of calculation were ... nearly extinguished, so that he was unable to work out the most simple sum'.

2.4.10 Musical abilities

The same four studies found that, as far as could be ascertained, the "aphasic's" musical abilities were unaffected. (By 'musical abilities' is meant singing, keeping time to music, whistling and humming melodies, and correctly identifying melodies.) In no case, however, was sufficient detail provided for one to be able to make a fuller assessment of the effect of the brain damage.[125] From a number of case-reports, nevertheless, it was clear that when speech was affected, the ability to sing may not have been affected at all. A Danish patient 'sang all the words he uttered' when his ability to speak was severely curtailed.[126]

2.5 Models of speech production

2.5.1 General

It has been pointed out already that a logical pre-requisite to the analysis of a "language" breakdown is the establishment of a model of, at the very least, speech production, so that the particular linguistic deficit may be located within that schema. If we look at the case-reports between 1793 and 1862, we find that in only a very small number of them was any explicit attempt made to set up such a schema.

2.5.2 Cognitive models

By the end of the 18th century, Alexander Crichton considered that the speaking process could be visualized as consisting of several discrete phases: 'Each idea as it is renewed, excites the sensorial impression, or impressions ... for through the brain and nerves alone can these impressions be transmitted to the organs of speech, which are stimulated by those nervous impressions to the utterance of those words, or sounds, which in our infancy we were accustomed to associate with our ideas.'(127) Between the publication of these admittedly not very precise words and 1834, when a more formal schema of speech production was suggested, no further suggestions were made (in print at least) as to the individual stages that underlie the production of speech. This situation may be compared with that in France, for example, where Bouillaud (see below p.162 and Figure 7) had explicitly spelt out his model of speech production.

Between 1834 and 1847 four case-reports included, mainly in fairly bald terms, details as to how, in the opinion of the authors, speech is produced. They are set out in Figure 6. Not only do they show that ideas comparable with those of Bouillaud were to be found in the British medical literature, but that it was recognized that any attempt to model the speech production process had to take account of three different disciplines: physiology, psychology and linguistics.

Osborne (1834) saw speech problems as permanent or semi-permanent versions of a transient condition that afflicts all normal speakers at times, namely 'occasions of forgetfulness'.(128) He then proceeded to set up two varieties of 'loss of memory of language'. The first was the 'imperfect recollection of dates and names, of places and persons', which he attributed to the 'softening of some portion of the

Figure 6

MODELS OF SPEECH PRODUCTION

(1834 - 1847)

Osborne 1834		'Memory of language'	'Mode of using the vocal apparatus'	'Vocal apparatus'	'Words pronounced'
Craigie 1836		'Faculty of remembering and distinguishing the proper words'		'Nerves' 'Muscles'	
Steele 1845		'Faculty of expression'	'Speaking Writing Gesture'	'Mechanical arrangement'	'Sounds'
Bishop, J. 1847	'Operation of intellectual powers'	'Verbal memory'	'Command over the voluntary movements of the respiratory-vocal muscles'	'Vocal organs'	'Words uttered'

brain in advanced age' whilst at the same time the 'faculty of language remains unimpaired ... and the individual speaks with his usual facility' - until such time as natural degeneration of the nervous system takes its toll. The second included cases of forgetfulness in which 'the word to be pronounced' can be recollected, but 'the mode of using the vocal apparatus, so as to pronounce it' is lost. This second category would seem to have much in common with a modern 'dyspraxic' view of aphasia.(129)

Craigie, too, in his comments appended to Craig (1836) drew a two-fold distinction broadly similar to that in modern terms between dysarthria and aphasia: 'affection of the nerves subservient to [the] muscles' and a 'lesion of the faculty of remembering and distinguishing the proper words to be employed'.(130)

Steele made a distinction between 'a mechanical arrangement, capable of producing a requisite variety and distinctness in the sounds uttered' and 'a certain power ... [to] control and direct their movements in obedience to [the speaker's] will'.(131) He associated the notion of a controlling factor with the phrenologists' 'Organ of Language',(132) and, following the views of John Cheyne, defined it as the 'Faculty of Expression'(133) or the 'controlling power', which presides over not only the organs of speech, but the movements of the hand in writing and the movements of the body in gesture. (He made no mention, however, of the role of this 'Faculty' in relation to speech-comprehension and reading.)(135) But whereas Osborne would find an explanation for speech disorders of this type in a disorder of memory, Steele argued that it was to be found not in memory but instead in the 'destruction of one of the means it possesses, of manifesting its

existence'.[136] An analogical situation, for Steele, was the function of the retina in a condition such as cataract: the power of sight remains, but the means by which this power is manifested, is destroyed.[137] The anticipation of Pierre Marie's view of aphasia is striking.

Bishop's three-fold distinction[138] was between a 'confusion of ideas' arising from 'imperfect operation of the intellectual powers', a 'want of words' due to 'imperfections of verbal memory', and, thirdly, 'the incapacity of uttering words', the result of either 'some imperfection of the vocal organs or ... an imperfect command over the voluntary movements of the respiratory-vocal muscles'.[139]

2.5.3 Neurophysiological models

The counterpart to any cognitive model of speech production such as those described above must obviously be a neurophysiological one, tracing the lines of communication from the "language" centre or centres in the brain to the individual muscles in the so-called organs of speech. Unfortunately there is nothing remotely equivalent to the cognitive model in neurophysiological terms.[140] Ironically, far more attention was paid by doctors who interested themselves in the subject of speech to the phonetics of speech sounds, (in the sense of the description and classification of speech sounds)[141] than to the physiology of speech. Even then, considerably more space was devoted to the description of the larynx than to either the supralaryngeal speech organs or the central nervous system. Thus, Lefevre epitomizes a widespread attitude when, in a discussion of speech production,[142] he states that 'The larynx is recognized as the seat of the voice in man', adding, almost as an afterthought, 'sounds are also formed in the mouth'.[143] Descriptions of the larynx and of laryngeal activity in

speech will be found in Richerand,[144] Charles Bell,[145] Müller[146] and Kirkes and Paget.[147]

Comments on the anatomy and physiology of the other speech organs are relatively infrequent; none of them even approximates to the degree of detail found in descriptions of the larynx. Bell[148] deals, in addition to the larynx, with the trachea and pharynx: the latter being an area 'imperfectly treated by authors' and yet one, in his opinion, of importance for an understanding of how 'articulate language' is produced. Thus he comments on the different degrees of displacement of the root of the tongue (the anterior wall of the pharynx) during the production of different vowel sounds.[149] He further comments on the action of the velum in the production of the 'explosive sounds'.[150]

Certain comments were made about the areas of the brain responsible in some (usually indeterminate) way for speech production: the corpora striata and the olives; these are dealt with in more detail below.[151]

Nevertheless, there is nothing that even approximated to a total overview of the physiology of speaking. In Germany, Johannes Müller could, perhaps, have provided such an overview; in the British Isles, the best placed person, in view of his specialist studies of the structure of the central and peripheral nervous systems, his interest in physiological phonetics and to a lesser extent in linguistic phonetics and in various forms of speech pathology, would have been Sir Charles Bell. But as far as one can tell, he never even contemplated putting together the various pieces of the jigsaw of speech production, relating what was known at that time about the course of the nerves as they emerged from the brain stem and spinal cord

to what was known about the fibre tracts of each of these nerves within the cerebral hemispheres. Instead, in his work one finds only some unconnected remarks. Thus, he says that speaking requires, in effect, the co-ordinated use of 'some hundred muscles' - the same muscles that are used in breathing, singing, coughing and sneezing.(152)

2.6 Language in the brain

2.6.1 Introduction

Descriptions of the history of research into the localization of "language" in the brain have tended to centre on the work of Broca, although some reference is usually made to the views of Gall, Bouillaud and Dax.(153) As a result, two misunderstandings of the actual course of events have come to be accepted as the standard interpretation: firstly, that the study of "language" localization was exclusively a matter for Continental doctors; and, secondly, that between the time of Bouillaud's first publication on the subject in 1825 and Broca's in 1861 the area of the brain which was believed to be directly involved in speech production was narrowed down from, generally, the frontal lobes to the left frontal until finally Broca concluded that only one particular section of the left frontal lobe was involved. Both of these views will be challenged and corrected.(154) Consequently, it will be shown in this section that Bouillaud's ideas acted as the focus of attention for British (as well as Continental) doctors engaged in the study of "language" localization - they were the closest that anyone came to constructing a neurolinguistic theory - and, secondly, that other, firmly held, views were current on the question of "language" localization.

In the 1793-1862 period in the British Isles, cases were reported of neuropathological data obtained at autopsies on "aphasics". In almost all of them, damage was detected that was regarded as having been responsible for the "language" disturbance(s).

The first of the British case-reports in the period 1793 to 1862 to include post-mortem descriptions of the condition of the brain was that by Cheyne.(155) He described the case of a woman, nine months pregnant, who suffered an apoplectic attack, which led to a right hemiplegia together with an inability to 'articulate'. Death followed, and at post-mortem a 'coagulum of blood' was found in the 'left [lateral] ventricle'.

Cheyne was followed in 1813 (although the work had in fact been first presented at a medical society meeting in 1806) by Baillie,(156) then by Abernethy,(157) Powell,(158) and Abercrombie.(159) The case-reports, however, were not directed specifically to the question of "language" localization, but dealt with a variety of pathologies within the brain. Nevertheless, the credit for making the first generalization about the location of "language" must go to John Abercrombie, who, in 1819, suggested that in most cases of paralysis involving a speech disturbance, the disease lay in one of the corpora striata.(160)

2.6.2 Some theoretical and practical questions

2.6.2.1 Is it "aphasia"?

There can be little doubt that the medical profession in general accepted that certain forms of linguistic breakdown were liable to occur as a result of brain-damage, yet some doctors were sceptical as to whether the relationship between "language" and the brain was as

straightforward as it might have seemed. For example, at a meeting of the Westminster Medical Society in 1838, one of those present commented during the consideration of a particular case of a man who had suffered the 'entire deprivation of the powers of speech' but whose comprehension of speech had remained unaffected, and who, some days later, made a sudden recovery, that 'if a person had the power of moving the tongue, and the voice was present, he must be an imposter if he did not speak'.(161) Another doctor, in a completely different context, attributed the condition of "aphasia" to insanity.(162)

2.6.2.2 The need for comprehensive data

Other doctors felt compelled to warn their colleagues of the shortsightedness of narrowing down the field of investigation in the search for a centre for "language" too quickly before a sufficiently large body of evidence had been carefully examined. Referring specifically to the views of Bouillaud and his opponent Cruveilhier, Abercrombie remarked that 'It does not appear that in any of these cases there was an examination of the spinal canal, so that perhaps we are not entitled to found any conclusions upon them; the subject deserves careful examination'.(163) And some years later, the Italian physician Odoardo Turchetti, one of whose cases of "aphasia" was reported in the British medical press,(164) also warned that in view of the fairly widespread areas of damage that purportedly led to "language" disturbances, it ought not to be forgotten that 'speech requires greater brain integrity than any other faculty'.(165) Equally, Steele(166) was unwilling to make any generalizations about the location of "language" in view of the often disparate sets of pathological data that had so far been reported. From these various

remarks, it is possible to conclude that no unanimity existed amongst the medical profession both as to the causes of "aphasia" as well as to the site of the underlying pathology.

2.6.2.3 Contradictory data

Moreover, there was no firm evidence to show that anything like a straightforward relationship existed between "language" disturbances and the brain. In 1830, Abercrombie reported that cases were known to have occurred of persons who had suffered extensive brain damage, but in whom no intellectual impairments whatever had been detected.(167) A number of cases were also reported of people who had shown marked linguistic disturbances in their lifetimes, but whose brains, at autopsy, revealed either no or only minimal damage. The most significant of these cases was that of a 30 year-old woman with 'thick and partially inarticulate' speech. Her brain, spinal cord, bones of the spine and, indeed, all other viscera were found to be in a 'healthy state'.(168) A second case, though not as perplexing to explain as the first, was of a 26 year-old man who had experienced 'some difficulty of articulation' as well as pain in the neck and other symptoms. His brain was found to be totally healthy; his spinal cord, however, was 'very soft'.(169) Whether his speech problem was related to the condition of the spinal cord is in fact debatable. He also suffered from a suppurating ear, and it is possible that this caused a degree of deafness which led, in turn, to the articulatory problem. (Abercrombie does not suggest this interpretation, however.)

Less easy to explain with any certainty, nevertheless, is the case of an elderly woman who suffered from 'loss of recollection',

'indistinctness of speech' and 'difficulty in writing'. The only discoverable pathology was an effusion into the ventricles. An explanation, however, may be in terms of normal neurological deterioration, in view of her age (80). A similar interpretation might be given to another, otherwise puzzling case: a 70 year-old man whose speech was 'very inarticulate', yet whose brain later revealed nothing more than a 'distension of the ventricles'; there was 'no other morbid appearance'.(170)

In another case, that of a man who had suffered a head-injury followed by right-sided convulsions, then right-sided paralysis, stupor and the inability to respond to questions put to him except with the word YES, the substance of the brain was found to be 'everywhere perfectly sound and healthy', although over the anterior and lateral aspects of the left hemisphere there was a sub-dural 'thick coating of coagulable lymph, smeared with pus ... [which] extended down the posterior part of the hemisphere nearly to its base'.(171) And lastly, another case involving the meninges, with no discernible damage to the cortex or sub-cortical structures, was that of a 36 year-old man whose articulation had been 'imperfect' and who had suffered from dysphagia and 'great difficulty in protruding the tongue': the only visible abnormality was a slight thickening and opacity of the arachnoid and pia at the base of the brain; the rest of the brain and all the other organs were 'natural'.(172)

What was one to make of such findings? Or rather what should <u>we</u> make of them, since none of the authors of the case-reports which have been quoted remarked on the absence or near-absence of pathologies

in the light of the symptomatology? To them such findings never constituted a 'problem', leading to a questioning of accepted theory: for at this time there was no obvious theory of the relationship between "language" and the brain. In the 1860s and later, however, such findings were to be used as strong counter-evidence to Broca's views on "language" localization.(173)

2.6.2.4 Neurological studies in the 19th century

A further factor to be taken into consideration when assessing the reliability of the information contained in the case-reports must be the quality of neurological studies during the first half of the 19th century. In 1821, Charles Bell described such studies as being in a state of 'endless confusion'.(174) And at least one medical historian, W.H. McMenemey, has described the period between 1800 and 1860 as one in which neurology 'as a science ... was scarcely in being'.(175) He notes, for example, that amongst medical practitioners in and around the year 1840, knowledge of neuroanatomy was 'rudimentary',(176) and is able to list the names of only nine British physicians of the 1830s and 1840s (out of a total of practising physicians of 1,700 in England alone in 1850)(177) whom he considered to have had 'a competent knowledge of neurology'.(178)

Such comments paint a gloomy picture. At worst, can one be certain, then, that when one reads in a case-report that the brain substance in the left corpus striatum was broken down the person making that statement was a competent observer? The answer, I believe, is, quite simply, yes. Firstly, because many of the reports were written by experienced practising doctors with a special interest in neurology; and, secondly, the competence of a physician to which McMenemey refers

has surely to do with his ability to diagnose (and where appropriate treat) a neurological condition, not to locate and describe certain structures in a brain during an autopsy.

From both the primary and secondary literatures in neuroanatomical and neuropathological studies of this period, one knows that a sufficiently large and well-authenticated body of knowledge existed on the macroscopic structure of the nervous system.(179) The anatomical and pathological textbooks and atlases of the brain produced by British doctors (many of them Scots) such as Alexander Monro (1787), Matthew Baillie (1793), Charles Bell (1802) and Richard Hooper (1826) illustrate and describe those macroscopic structures that are found in today's textbooks and atlases, although sometimes under different names. One important difference between descriptions then and now is that at that time the orientation was entirely macroscopic: it was only in the 1840s that microscopy came into fashion generally in medical studies, and, particularly following the publication in 1858 of Virchow's classic work on cellular pathology, that a more microscopic and histologically-oriented description began to predominate. In one of the case-reports,(180) tissues viewed microscopically are described; this was undoubtedly the first example of its kind in neurolinguistic studies in the British Isles.

As far as categories of neuropathology are concerned, one finds in the work of, for example, Baillie (1797) categories such as inflammation, tumour, abscess, gangrene, abnormality of texture (e.g. 'very soft', 'very hard') and vascular disturbances. This list may be compared with the briefer and more general categories favoured by Hooper (1826) and with the terminologically more modern set (for example, atrophy, haemorrhage, pus, carcinoma) used by Carswell (1838).

It would seem then that there is little reason to doubt the ability of doctors in the first half at least of the 19th century to describe lesions in such a way that their present-day terminological equivalents can be found. If there is any caveat concerning this subject, it must be to do with the methodology of brain autopsies. Today's methods of 'fixing' date back little more than a century.(181) Before then, a variety of methods had been tried, including soaking in wine, boiling in water or oil, and freezing. A major advance was achieved by Reil who, in 1809, introduced the technique of soaking the fresh brain in alcohol.(182) In some of the case-reports of "aphasia" there is no indication of how much time elapsed between death and an autopsy: one cannot therefore rule out the possibility that, unless the brain had been somehow fixed, there might have been some deterioration of its substance.

2.6.2.5 Accuracy of description of lesion

In the case-reports one notices a wide range of variation in the precision with which the type and location of the lesion is described. On the one hand, Tebay(183) gives a beautifully precise account which allows one to judge almost exactly where the lesion was: 'in the left anterior lobe, about ½" above the orbit the membrane had a depressed and puckered appearance, resulting from a loss of cerebral substance'. On the other hand, thirty years earlier, Abercrombie(184) had simply stated that a 'tumour was found in the left pons' and, in another of his cases, that 'there were cavities in both hemispheres'.(185) Even when the description of the damage is lengthier, it is not necessarily less ambiguous to interpret: cf. Abercrombie's statement that in one of his patients 'a small coagulum of blood, no larger than a small

bead' was found 'near the posterior part of the hemisphere'.(186) Which hemisphere? Was it in the grey or white matter? How far back was it? The solution to such questions would have been a sketch diagram, but in none of the case-reports is there one. In many cases, particularly the earlier ones, one is left to speculate as to the exact location of the damage.

It should, nevertheless, not be thought that the often imprecise descriptions reflect a careless attitude to the task of describing the site and type of lesion. In the context of work on the brain and "language" prior to the 1860s there appeared to be no need to be as specific as, fortunately, Tebay in 1848 had been; for the reader of the case-reports, the general area of brain appeared to suffice. And, in a sense, the need for greater precision was not advocated by foreign clinicians with a particular interest in neurolinguistic matters, such as Bouillaud: he had, after all, localized "language" in the anterior lobes (but see below p.169 for a significant and hitherto overlooked qualification of this point of view). Nevertheless, one can sympathize with David Ferrier's view, some years later, that 'there is nothing that gives greater cause for lament than the vagueness which characterises the great majority of reported cases of brain lesion'.(187)

2.6.2.6 Multiplicity of deficits

In all the case-reports a mixture of symptoms, some of which are now typically associated with "aphasia", were present, such as hemiplegia and visual disturbances. Not surprisingly, therefore, there are few occasions when clinicians attempted to differentiate between the damage that had caused the "aphasia" and the damage responsible for the other symptoms.

A considerable variety of other 'deficits' are reported, the majority of them clearly related to neurological and/or vascular disturbances of one sort or another. The remainder are conditions whose etiology is uncertain, and which therefore may not be of any relevance in assessing the neuropathological data. Symptoms such as rheumatism, bronchitis, stomach pains would seem to be more likely excluded from than included in any neurological syndrome, whereas in cases which involved 'discharge from the left ear' or 'giddiness' or 'injury to the nose' one connot expressly discount the possibility that the etiologies of these conditions may, in some direct or indirect way, be relevant to the interpretation of the brain autopsy findings.

These other deficits, some of them described as causes, others as symptoms, may be categorised as follows. It will be seen that most of the neurological symptoms were either frontal lobe or pre-Rolandic, with a small group around the insula and the peri-Sylvian cortex. Hence, any attempt to distinguish, for example, between insular damage resulting in a form of "aphasia" and in a psychiatric illness is bound to be exceedingly difficult.

1. Diseases: Apoplexy, hysteria, injury to the nose, pregnancy, stroke, sun-stroke, discharge from the left ear, meningitis, gastroentiritis, near-drowning, typhoid, bronchitis, serpent bite, epilepsy, uterine cancer, intestinal disturbance.

2. Non-CNS symptoms: sudden collapse, history of rheumatism, fever, stomach pains, cough and expectoration, sickness, pain/stiffness in the neck, distension of the blood vessel of the eye, dyspepsia.

3. CNS symptoms:

(a) Unlocalised: eating and drinking, headache, giddiness.

(b) Higher nervous functions: speech, difficulty in keeping awake, insanity, fright, coma, delirium, dementia.

(c) Motor: convulsions, paralysis, shivering fit, loss of power, inability to move, prostration of strength.

(d) Special senses: vision, taste, hearing, smell, vertigo.

(e) Sphincter: loss of sphincter control.

(f) Bulbar: deglutition difficulties.

(g) Sensory: [no symptoms reported].

Some of the difficulties associated with attempting to localize "language" when a multiplicity of other behavioural deficits had also to be explained in terms of the neuropathology may be gauged from a consideration of one of Cheyne's cases.(188) He described the case of a 65 year-old woman, who, apart from being corpulent, sedentary, pale, temperate, phlegmatic, peevish and prone to taking snuff(!), suffered from a variety of conditions, almost all of which may have had a neurological origin. These were, in chronological order of appearance: loss of sight together with an associated headache; mental confusion accompanied by euphoria, leading in turn to the loss of any distinct recollection of events; convulsions, more severe on the right side of the body than the left, alternating with spasms about the eyes and mouth; an inability to answer questions except with YES and NO; an unwillingness to swallow anything unless it was deemed to be palatable; loss of sphincter control; and, finally, progressive emaciation.

The autopsy revealed eight noticeable features, some of which might be considered in no way abnormal: no blood under the skull cap; a normal-looking dura; at the 'back part' of the brain, serous fluid mixed with blood which had sunk deep down between the gyri - in certain cases to more than an inch, and separating the sulci from one another by as much as a quarter of an inch; moderate distension of the veins of the pia; a soft and watery texture to the overall brain substance; non-uniform distension and enlargement of both lateral ventricles, the choroid plexus being pale in colour and filled with watery vesicles containing an indeterminate yellowish fluid; the left corpus striatum much softer than its counterpart in the right hemisphere, but both of an 'unusual brown' colour; and, finally, considerable inflammation of the pia on the base of the brain - but only in certain places.

With the benefit of hindsight, one might ascribe the patient's grossly limited capacity to respond to questions to the condition of the left corpus striatum. But as for the remaining symptoms and attempts to correlate them with the brain pathologies, the task of unravelling them, in the light of neurological knowledge at that time (1812), would have been fraught with difficulties.

Cheyne's case is extreme in that no other report from this period contains examples of so many behavioural deficits and of so many different neuropathologies. Many cases were easier to understand, and this led some clinicians to ask, on the basis of the cases they themselves had observed, whether it might be possible to find in the brain a particular area (or areas) that was, in some general sense, responsible for "language".

2.6.3 Phrenology and "language" localization

The view of the phrenologists[189] was that there was an organ or even two organs of language at the front of the brain. Gall had established two centres, one the 'memory of words' behind the eye, the other beneath the eye; Spurzheim had only one centre 'for Language', beneath the eyes.[190] The views of the British phrenologists, however, as expressed by George Combe and Richard Cull, were not quite unanimous. Combe located 'the organs of language' 'on the middle of the supra-orbitary plates of the frontal bones';[191] whereas, twenty years later and without any explanation for the slight change in location, Richard Cull announced that 'the cerebral organ [of language] lies on the posterior part of the super-orbital plate'.[192]

In the phrenological literature of this period - it extends from 1824 to 1847 - a number of cases were reported of "aphasia" in which details were given of the location of the organ or organs of language. The information about the site was gained from one of three sources: the site of any pain which accompanied "aphasia"; the site of external damage to the skull penetrating into the brain substance, which accompanied cases of traumatic "aphasia"; and, thirdly, the site of brain lesions found during the autopsy on "aphasics".

What is clearly of exceptional significance is that whereas Gall and Spurzheim had located language behind or beneath the eyes, both George Combe and Cull located it above the eyes. With one exception, all the British phrenologists concurred with the views of their compatriots, not with Gall or Spurzheim. In five of the six cases in which the pain accompanying "aphasia" is described, the location is 'above the orbit' or 'above the eyes'.[193]

In the sixth, the location is the general area behind the retina, where a blood-vessel had burst.(194)

Two cases which report damage to the skull and brain tissue agree on the location: above the eyes.(195)

It is the evidence of lesions described at post-mortems that provide some of the most interesting evidence, for in certain cases they throw considerable doubt on the validity of what seemed to be the accepted phrenological view that language is located at the very front of the brain. It was found in one case, for example, that there was no damage whatever on the external surface of the cortex (as predicted by the Gall/Spurzheim and the modified British theory) but only on the inner surface and in the white matter. Blood-clots were found 'from the lateral ventricle forwards to half an inch from the surface of the brain ... over the middle of the supra-orbitar plate'.(196)

Not only is the deeper location of importance, but also the fact that the damage was in only one hemisphere, the left. According to accepted phrenological thinking, both hemispheres ought to have been damaged. Another case also reported deeper damage, in the lateral ventricle (we are not told on which side) and in the white matter of the corpus striatum.(197) Even more surprising was that in a third case, besides 'ramollissement the size of a shilling on the inferior surface of the anterior lobes' and excess fluid in both lateral ventricles, the 'middle lobe' of the brain had a concave configuration. This ought at least to have raised very serious doubts of the continuing validity of the traditional view of the location of language.(198) Finally, a fourth case contradicted the view that language was above

the eyes: damage was found in only one hemisphere (the left), in the posterior lobe of which there was 'a manifest elevation and projection, somewhat resembling a tumor'; serum was also found in the lateral ventricles and there was slight softening in the thalamus.(199) Again, this passed without comment.

Where, then, according to the phrenologists, was language to be found? On the evidence published in their own journals, it seemed to be either in the frontal poles or more caudally as far as the corpus striatum and thalamus. There was also evidence of damage much further back still, in the posterior lobe.

Nowadays one can explain these apparent exceptions in terms of the knowledge achieved mainly in the 1860s and 1870s about the lesions which cause various forms of "aphasia". As a statement of the views of a 'school of thought' on brain-behaviour correlations, the discrepancies are unusual. One can only conclude that from the 1830s onwards, four views as to the location of 'Language' were current; at no time, however, was any attempt made to reconcile the different opinions.

2.6.4 Cortical and non-cortical areas of damage

An examination of the British case-reports reveals that more than 35 different areas of the brain were considered to have been responsible for the variety of deficits observed amongst the patients; this includes the symptoms of "language" disturbance. As pointed out earlier, however,(200) the sheer multiplicity of symptoms makes it impossible to determine whether any one area of the brain can be considered to have been the source of the "language" disturbances.

At best, one can merely list the areas and indicate the percentage frequency of occurrence of lesions, bearing in mind, of course, that one cannot be completely certain that "language" was localized in any one of them.

For the purposes of discussion, the 35 different loci have been grouped into 14 major parts of the nervous system. The latter have been established on a somewhat unconventional basis. Rather than use the accepted general divisions such as telencephalon and diencephalon, I have grouped together the specific areas on a geographical basis. Thus, the ventricular system has been treated as a single concept rather than split between the telencephalon, the diencephalon, the metencephalon and the myencephalon. Similarly, the basal ganglia and the thalamus have been treated as a unit rather than be separated into parts of the telencephalon and the diencephalon.

The areas of the brain in which damage was found in those patients with symptoms of "language" disturbance, together with the percentage frequency of occurrence of reported damage in these areas, were as follows:

1.	Meninges	12.23%
2.	Blood Vessels	4.22%
3.	Cerebral Cortex and Cerebral White Matter	27.42%
4.	Corpus Callosum	1.26%
5.	Ventricular System	24.05%
6.	Fornix etc *	4.22%
7.	Basal Ganglia & Thalamus	10.12%
8.	Lower Surface of Hemispheres**	2.53%

9.	Areas relating to superficial attachment of cranial nerves	1.27%
10.	Pons	1.68%
11.	Cerebellum	2.11%
12.	Medulla	4.64%
13.	Spinal Cord	1.26%
14.	'Brain'	2.95%

* This includes the fornix, septum lucidum and the corpora mamillaria.

** The few case-reports relevant to this category refer to the 'base of the brain', which could, of course, mean the brain-stem as well as the cerebrum.

Two main areas of damage are evident: the cerebral cortex and white matter, and the ventricular system.

In view not only of the theory advanced by the phrenologists about "language" localization but also that of Bouillaud[201] and, later, that of Broca,[202] it is of value to consider in more detail the results of autopsies on those "aphasics" in whom damage was found in the cortex and white matter. Eleven cases involved the left hemisphere, and two the right hemisphere.

Of the left hemisphere-damaged patients, only four appeared to have suffered from a disturbance of speech alone;[203] the remainder had, for example, difficulties of vision, of deglutition, etc. One of the four, a man who 'misapplied words' and whose speech was described as 'indistinct', was found, at post-mortem, to have a 'soft vascular sac' in the 'posterior part' of the left hemisphere.[204] A second patient, a man with 'inarticulate' speech, had a 'tumour, the size of a small orange' on the pars petrosa of the left temporal bone.[205]

In neither case, then, was there any damage in the frontal lobe. The remaining two cases yield less specific information: in one, a man with 'very indistinct' speech, a cyst was found in an unspecified part of the left hemisphere;[206] in the other, there was blood 'over the left convolutions'.[207]

The actual loci of damage in the other cases (those involving disturbances additional to speech) varied from 'near the posterior part of the left hemisphere'[208] or, much more precisely, 'about 1 inch from the posterior surface of the cerebrum, and nearly on a level with the corpus callosum'[209] to 'an area above the ventricles';[210] an area 'about the middle of the left hemisphere near the falx'[211] or, simply, to a generalized anterior section of the hemisphere.[212] Two cases, however, do mention that the damage was in the upper and inner part of the hemisphere,[213] and a final case was reported of damage in the 'forepart of both anterior lobes'.[214]

What emerges very clearly from this summarization of damage in the cortex and white matter of the left hemisphere is that no particular area can be said to have been the source of the damage that had led to the "aphasia". Such findings, although at the time unremarked upon by the clinicians themselves, nevertheless laid the foundation for a wider view of neurolinguistic correlations that developed in the mid and late 1860s in the British Isles as a result of the influence of Broca's views (or distortions thereof) on the work that was carried out in this field.[215]

Turning briefly to the two cases that were reported of right hemisphere damage: one was a case of echolalia in which extensive softening was found in the whole of the hemisphere;[216] the other a case of 'some imperfection of speech' which later deteriorated into a 'total loss of speech'. The autopsy revealed a 'well-defined cavity' in an unspecified part of the hemisphere, together with several small cysts in 'various parts' of the same hemisphere. What makes this case particularly interesting is that the patient had suffered from a left-sided 'weakness': whether he was left-handed is not mentioned, however.[217]

2.6.5 Bouillaud's views on "language" localization

In a thesis ostensibly dealing only with neurolinguistic studies in the British Isles, it might seem unusual to devote space to a consideration of Continental views on the relationship of language and the brain. The reason for taking account of Bouillaud's views is that certain clinicians in the British Isles were aware of them and assessed their patients in the light of them. Furthermore, Bouillaud's views represent a distinct theoretical point of view, as do those of the British phrenologists, and consequently they should be considered as aspects of a wider, less chauvinistic, account of 19th century neurolinguistics.

Commentators in the late 19th century and in the 20th century have accorded Bouillaud his rightful place in the history of the study of the localization of language, but, to my mind, his views have never been properly examined. Brain,[218] for example, is typical of many when he states that Bouillaud localised 'a special centre for speech ... in the anterior lobes'. This, as we shall see, is not quite as

correct as it may sound. Equally, David Ferrier[219] claimed that Bouillaud had concluded that 'lesions of the anterior lobes ... caused loss of speech'. Again, this statement requires some qualification. Both Goldstein[220] and McHenry[221] emphasize, to the exclusion of other important aspects of Bouillaud's ideas, a distinction in Bouillaud's work between what Goldstein glosses as the 'intellectual' and 'mechanical' aspects of speech production. Head, in what is the longest and to date most detailed summary of Bouillaud's ideas,[222] errs in presenting them as if they had remained consistently the same from the time of his first paper on the subject in 1825 up to the views he expressed forty years later at one of the heated discussions, in the Académie Nationale de Médecine, on Broca's researches.

In this section I shall show (a) that Bouillaud's views underwent important modifications; and (b) that contrary to the interpretations that have been given them (especially by Head), they are much subtler (and sometimes more confusing) than would appear to be the case. To say that Bouillaud localized the 'faculty of speech', as many people have done, is to grossly oversimplify his theory.

His views on the localization of "language" are to be found mostly in papers he read to the Académie Royale [›Nationale] de Médecine in Paris between 1825 and 1865.[223]

His theory revolves around two central issues: what form of 'apparatus' is required for "language" production, and where in the brain is the means by which we produce speech? In working out the theory, Bouillaud introduces concepts such as the intellectual and non-intellectual aspects of language, the coordinating control of the muscular movements used in speech and the memory-store for words.

In his first publication (1825a), he draws a very clear distinction between two aspects of speech production:[224] the faculty of putting thoughts into words and retaining the words in memory, and, secondly, the faculty of articulating words:[225] 'le système nerveux qui préside à la formation des signes n'est pas le même que celui qui produit les mouvemens des organes de la parole'. This 'faculty of articulating words' consists, in turn, of two elements, an executive and a coordinating one: 'l'organe qui exécute et coordonne les mouvemens musculaires nécessaires ... à la production de la parole'.[226] The two elements together constitute what he calls 'l'organe législateur de la parole',[227] situated in the frontal lobes.[228] It is crucial to realize that what he is locating in the frontal lobes is this executive and coordinating faculty; he says nothing, at this point, about the location of the other aspect of speech production such as the faculty of putting thoughts into words and retaining words in memory: 'la faculté de créer des mots comme signes de nos idées, d'en conserver le souvenir'.[229] As far as a more immediate location for this faculty within the frontal lobes is concerned, he suggests (but is not adamant about it) that the faculty of 'putting thoughts into words' may be in the grey matter (although he does not say which particular zone of grey matter), and the executive and coordinating faculty in the white matter (of the frontal lobes). However, he contradicts himself at one point when he quotes in support of his own view a case by Lallemand[230] in which the grey matter was found to be diseased, not the white.

In a book, published the same year (1825b), he develops his ideas somewhat, at the same time introducing an element of confusion

into what, apart from the use of the Lallemand evidence, had been an otherwise perfectly soundly argued case. The frontal lobes now become the seat of 'les organes de la formation et de la mémoire des mots' (in effect a rewording of his 1825a description 'la faculté de créer des mots ...)[231] and he introduces as a synonym for it 'l'organe du langage articulé'.[232] It should be noted that this has nothing whatever to do with articulation or with coordinating the necessary muscular movements for speech. In fact, nothing is said at all about where 'l'organe qui exécute et coordonne les mouvemens musculaires...' is localized. Effectively, the frontal lobes have ceased to be the home of the executive and coordinating faculty and have become instead what he was later to refer to as 'la partie intellectuelle' of speech production.

At this point he makes an interesting observation, which is subsequently dropped from all of his further comments on speech production. He sub-divides 'l'organe du langage articulé' in terms of the grammatical function of words: one section of it is concerned with nouns, another with verbs, another with adjectives, and so on. He hints at the possibility that in cases of "aphasia" these sub-sections may be selectively damaged: for example, only nouns, or verbs might be affected.[233]

The next year, 1826, saw the publication of another paper in which Bouillaud reverts to his original view that in the frontal lobes is situated 'un organe spécial, chargé de régir les mouvemens des organes de la parole';[234] this he calls 'cet organe législateur'.[235] He says nothing about the location of the other aspect of speech production, the intellectual part. He does, however, point out that

cases of loss of speech might result from damage to the intellectual or the executive-coordinating aspects; and, furthermore, that damage in one frontal lobe will not necessarily lead to a loss of speech.

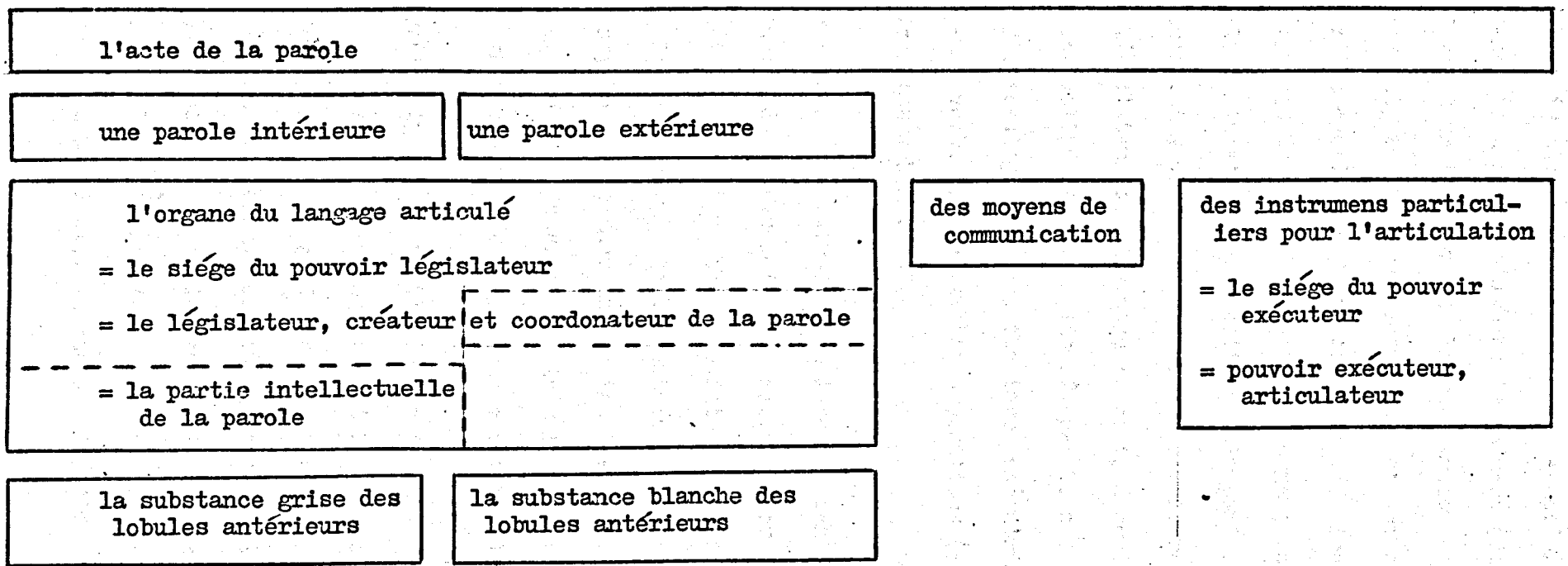
A gap of more than 10 years now intervenes before he comments further (in public at least) on the localization of language.(236) In a paper read before the Académie Nationale de Médecine (1839-1840), the basic approach to the question of the localization of speech remains the same, but there are some new subtleties. More than anything else, however, for anyone who had read Bouillaud's earlier work, there is a confusing array of new terminology: this despite the fact that Bouillaud was himself fully aware of the pitfalls of metalinguistics: 'Pour prévenir les équivoques, si fréquentes dans les discussions médicales, il nous importe de poser bien nettement et avec une exactitude rigoreuse, une clarté géométrique, les termes du problème qu'il s'agit de resoudre'.(237)

The total process of speech production is now set out more fully, in three distinct phases (see Figure 7): ideas are put into verbal form, the necessary commands are coordinated, and then sent along particular routes to the organs of speech. It will be seen that 'l'acte de la parole' involves 'l'organe du langage articulé', 'des moyens de communication' and 'des instrumens particuliers pour l'articulation'. Bouillaud does not, however, say anything at all about the 'moyens de communication': whether they are to be understood as the nerves supplying the organs of speech or whether they also include the intra-cerebral tracts leading down to the attachments of the cranial and spinal nerves.

Figure 7

BOUILLAUD'S SCHEMA OF SPEECH PRODUCTION

(1839 - 40)



Based on Bouillaud (1839-40: 282-285)

Clearly, there is the possibility of very considerable confusion over some of the new terminology which he introduces (quite apart from the extension of the term 'l'organe du langage articulé', which in 1825b had referred only to the intellectual aspects of speech production, to cover the coordinating aspect as well). The 'pouvoir législateur' is synonymous with the redefined 'organe du langage articulé', but 'le législateur' by itself is only part of that aspect. (In 1825a, of course, the word 'législateur' had referred to what is now 'le pouvoir législateur'!) The term 'pouvoir executeur' refers specifically to the action of the organs of speech, not to the cerebral activity preceding this; and the term 'exécuteur' which had figured, albeit as a verb, in the earlier expositions (e.g. 1825a) is now dropped from the schema.

A novel feature is the introduction into the schema of 'la partie intellectuelle de la parole', the capacity for acquiring new words, alongside that of putting thoughts into verbal form and storing them in memory. It is difficult to be certain as to Bouillaud's meaning, but he may be saying that in the intellectual part there is the capacity to create neologisms, as distinct from learning for the first time words that are otherwise part of other people's vocabulary.

Whereas previously he had vacillated as to what aspects of the speech production process were in the frontal lobes, now he is quite dogmatic (despite the weight of evidence ranged up against him)[238] that the entire 'organe du langage articulé', the intellectual and coordinating aspects of speech, is located in the frontal lobes; this view he continuedto hold.[239] And from 1825 onwards he refused to be drawn as to where, more precisely, in these lobes this 'organe' was

located. However, in 1847b (and the comment is allocated to a footnote as if it were of little significance) one finds his view on the more precise location of the 'organe': 'La face inférieure et l'extremité antérieure des lobules antérieurs ... paraîssent être spécialement le siége de cette admirable faculté' - in the inferior frontal gyri or, more rostrally, in the frontal poles.(240)

2.6.6 Bouillaud's views in the light of the British data

2.6.6.1 Agreement

The only clinicians in the British Isles prepared to state in print their acceptance of Bouillaud's claim that the 'faculty of speech' lay in the 'anterior lobes' were Holland(241) and Dunn,(242) although Holland did admittedly temper his statement with a cautionary note to the effect that the subject 'is not without much ambiguity'.(243) Thomas Watson(245) gave an incomplete summary of Bouillaud's position and included the views of some of Bouillaud's critics, especially Cruveilhier and Andral. His own conclusion was that the 'faculty [of speech] is under the special guidance of some definitive part within the cranium' - but he did not speculate on which part it was.(246)

In view of the frequent generalizations as to the location of the brain damage (see above p.151), there are only a handful of cases in which the information presented is sufficiently precise for one to assess the validity of Bouillaud's ideas in the light of the British evidence. Powell(247) described how in the case of an elderly man who suffered from 'loss of power of speech' as well as from a left-sided hemiplegic chorea, damage was found in the 'fore part of both anterior

lobes'. A patient of Abercrombie's[248] had 'indistinctness of speech' together with a right hemiplegia: the autopsy showed damage in the 'anterior portion of the left hemisphere'. Tebay's patient (quoted earlier p.151), who strove 'in vain to recal [sic!] words' but whose 'articulation of some words was tolerably distinct' when he could recall them, and who also suffered from a 'very defective memory of words', had damage in the frontal pole of the left hemisphere, half an inch above the orbit: the membranes had a 'depressed and puckered appearance' due to a loss of cerebral substance.[249] Lastly, Winslow recounted the details of a case in which there was a 'considerable loss of power of articulation' as well as 'defective articulation', resulting from a softened area, the size of a shilling, on one of the anterior lobes.[250]

2.6.6.2 Disagreement

Direct criticism of Bouillaud was, however, to be found. Marshall Hall, for example,[251] gave prominence to the anti-Bouillaud standpoint of Andral and Lallemand.[252] Noble, too,[253] was equally opposed to Bouillaud's views. Goolden[254] pointed out that 'the idea that the anterior lobes of the brain preside over the faculty of speech ... is far from being generally accepted'. Winslow[255] marshalled considerable evidence against the views of Bouillaud, adding that 'to prove anything like a physiological and pathological relationship between the phenomena it will be necessary to establish a greater uniformity of cause and effect than the researches of morbid anatomists at present appear to justify'.[256] Whether any of Bouillaud's supporters or critics had actually read his work in the original French and seen the subtleties (and contradictions) it contained, is not known.

On the other hand, however, there were other, equally compelling examples - nine in all - in which speech had been disturbed as a result, the clinicians assumed, of damage behind the central sulcus. The most significant of these was one, described by Abercrombie,(257) of a man who 'misapplied words' and whose speech was 'indistinct and after some time inarticulate'; there were no other linguistic or non-linguistic symptoms - a rare example of what in later years was known as pure expressive aphasia. The post-mortem revealed only one locus of damage: a 'soft vascular sac' in the posterior part of the left hemisphere; the rest of the brain was normal. The case ran clearly counter to Bouillaud's theory. Whether it was actually a case of Wernicke's aphasia (with Abercrombie failing to detect the receptive loss) is an intriguing question, which cannot be answered satisfactorily.

A second of Abercrombie's cases(258) involved a right hemiplegia as well as a "language" problem: a young boy became 'speechless' (we are not told any more than this) and three days later hemiplegic. At post-mortem, the meninges were found to be firmly attached to the 'middle lobe' of the left hemisphere, with fluid beneath them. Again, we are not told how far the fluid extended, but if it was restricted to the 'middle lobe', then the symptoms of speechlessness and hemiplegia must have resulted from damage of some sort in that lobe - a counter-example to Bouillaud.

The remaining cases(259) contain further evidence to show that damage was found in the non-anterior lobes of the brain. Since, however, other symptoms besides a disturbance of speech and other parts of the brain were involved, it is clearly impossible to say unequivocally that the linguistic as distinct from the non-linguistic conditions must

have arisen as a result of damage in that broad area.

In summary, it would seem that, like the evidence of speech-brain correlations discussed in France, certain cases of loss of speech were believed to be the result of anterior lesions, others of lesions elsewhere in the brain. It was only in the 1860s and 1870s, as a result of the prominence given (primarily on the Continent) to the hypotheses of Broca and Wernicke, that explanations could be found more readily for the types of neurolinguistic data that British clinicians had uncovered.

2.6.7 Further hypotheses on the localization of speech

2.6.7.1 Corpora striata

The deliberately inherent generality of Bouillaud's theory, that speech was located in the anterior lobes, not in any one specific part of the lobes (but see p.169) stands in contrast to two other hypotheses that received a certain amount of attention from British clinicians: that the corpora striata and the olives play a significant role in speech production.

It seems that the first clinician to put forward the view that the corpora striata are of major importance in speech was John Abercrombie, in 1819. Writing of cases of 'paralytic affection', he says that 'in many cases in which the speech has been chiefly affected, the disease has been found to be in the corpora striata'.(260) Perhaps equally important is the fact that in none of his first three publications dealing with speech problems (1818a,b, 1819a), which contain details of 15 cases of "aphasia", were the corpora striata mentioned in the post-mortem findings.(261) Nor in his later work.(262)

Apparently, his conclusion was based on a wider number of cases than were reported in his published case-histories. Of course, remarks such as 'cysts were found in both hemispheres' could apply as much to the corpora striata as to the rest of the hemispheres.

Abercrombie's view was not taken up by any of his colleagues until 1831 when Richard Bright wrote that he had 'very frequently' found, in cases where 'articulation' had been affected as the result of apoplexy, that 'the injury has been situated so as to produce pressure or laceration of the posterior part of the corpus striatum'.(263) This comment drew no reaction whatever from the contemporary medical world in the British Isles, and more than 25 years were to elapse before the topic was again broached.

Writing at a time when greater knowledge existed about the intracerebral tracts and indeed of the finer aspects of neuroanatomy in general, Robert Dunn(264) felt able to agree with Bouillaud's view of the role of the frontal lobes in speech production, but added that for there to be speech, 'integrity of the corpora striata and their commissural fibres, as the motor channels through which the will or volitional power operates in speech' was essential. He further pointed out that in his experience the 'imperfect power of articulation' was 'most generally' owing to damage to the 'corpora striata or among their commissural fibres [that] radiate [from the] cerebral hemispheres'.(265)

Of the case-reports, thirteen quote examples of lesions in at least one of the corpora striata.(266) Three of these have been discussed already.(267) A further case(268) was one in which the

corpora striata were observed to be more damaged than any other part of the brain: the patient had been 'unable to articulate' or move his tongue. The other nine cases[269] all involved greater (in some cases massive) degrees of brain damage, together with a variety of other behavioural symptoms. From these, therefore, one can conclude nothing about the role of the corpora striata in speech production. And, in fact, no 19th century clinician - at least before the 1860s - attempted to explain what role this might be. In a sense this may seem surprising, since Bouillaud's distinction between the intellectual and non-intellectual elements in speech ought, one imagines, to have set minds thinking out whether the non-intellectual aspects could be related to the functioning of the corpora striata.

2.6.7.2 Olives

The role that the olives might play in speech production was by no means a discovery of the 19th century. In fact, the earliest example of the hypothesis was put forward in the 17th century by Thomas Willis. His evidence, and that of later clinicians such as Retzius, Müller, Duges and Pinel, was given currency not by a British clinician, but by a Continental one, the Dutchman J.L.K. Schroeder van der Kolk, whose work on the spinal cord appeared in an English translation.[270] Essentially, his (and the earlier clinicians') view was that the olives were 'closely connected with speech' since they were the 'organs of articulation of the voice'.[271] The cases he presented as evidence of the hypothesis were summarized by Winslow,[272] but the impression made by his ideas on his British colleagues would seem otherwise to have been nil.[273]

2.6.8 The predictive value of localizationist evidence

Despite the lack of even a semblance of unanimity amongst British clinicians about the location of "language" in the brain, it is of interest to note that certain of them felt able, nevertheless, to predict in individual cases where, at post-mortem, the damage would be found to lie.(274) The justification for this was not that clinicians necessarily understood the total process of "language" production, from the cortex (if that was the 'starting-point') down to the muscles, but that sufficient was known about the course of the cranial and spinal nerves from the point at which they emerged from the brain-stem and spinal cord to their points of insertion into the muscles of the organs of speech, to make generalizations seem possible. In two cases, however, the clinicians felt confident enough to be able to predict the location of the damage within the cerebrum itself.

The predictions fall into three broad categories. In the first, certain unspecified parts of the peripheral nervous system are held to be responsible for the damage: 'paralysis ... of the muscles of the larynx',(275) 'spasmodic affection of the respiratory nerves and muscles'.(276) In the second, the damage is attributed to specific, named parts of the peripheral nervous system: Copland,(277) for example, suggests that the 'origin or along the course of the lingual or glossopharyngeal nerves' is the seat of the damage. And in the third category, particular parts of the cerebral hemispheres are held to be responsible. Bright(278) attributes the 'incoherent speech' and the word-finding difficulty experienced by his patient to 'some part of the corpora striata'; Dunn(279) believed that his patient's use of wrong words and eventual speechlessness (apart from dat dat) to result from damage in the left hemisphere and left corpus striatum.

2.7 "Aphasic" phenomena as diagnostic signs

It has been shown that, during the period under consideration, the view was accepted that, on the evidence of pathology, "language" was located in one or more areas of the brain - although there was nothing approaching a consensus as to the exact site. A further conclusion, however, that runs through many of the case-reports was that certain causal relationships existed between "language" and brain pathologies: that, for example, an attack of apoplexy would, on average, lead to a disturbance of speech, and, conversely, that a disturbance of "language" might be taken as a sign of an impending apoplexy or some other condition. From this it is clear that "language" was beginning to be accorded the status of a diagnostic sign. It was coming to be recognized as a feature in a set of different clinical syndromes. These syndromes, in the case-reports, were: apoplexy, intra-cranial inflammation, haemorrhage, paralysis and imbecility.

As far back in the history of medicine as Hippocrates, it was recognized that a disturbance of speech could be one of the consequences of apoplexy.(280) John Cheyne, however, took the argument further and stated that a disturbance of speech would follow as an automatic consequence in all cases of apoplexy.(281) Abercrombie, however, adopted a more cautious point of view, noting that speech may indeed be affected in apoplexy but not necessarily in all cases.(282) Watson, in 1843, emphasised the possibility of a transitory, not permanent disturbance when he maintained that one of the effects of apoplexy could be 'some imperfection of speech', but this might last only a short time.(283) The first explicit reference to a disturbance

of speech being a premonitory sign of apoplexy appeared in Watson:[284] the patient would show evidence of a partial loss of memory, forgetting certain words and substituting others for them in his conversation.

Speech disturbances were also regarded as heralding the onset of intra-cranial inflammation: in fact, speech had to be regarded as one of the eight[285] key signs of approaching inflammation. The speech would be characterized as having 'indistinct or difficult articulation' and there might also be unusual changes of tempo: either too quick or too slow.[286] Later, Abercrombie modified the concept of purely articulatory and temporal alterations to include more general mental factors, such as 'a peculiar confusion of thought and forgetfulness on particular subjects.[287]

As for haemorrhage, it was felt by those who ventured an opinion in print on the matter, that a loss of speech would be an automatic consequence of the condition; where there was only a partial haemorrhage, the speech disturbances would be less severe.[288] Belhomme was even prepared to say that a sudden loss of speech indicated that there had been a haemorrhage in the frontal lobes, in most cases in both of them![289]

When a person became paralysed, the correlation with speech disturbances was regarded as being more complex, and less predictable. Abercrombie[290] believed that in cases of a 'paralytic attack', loss of speech, together with hemiplegia, could be expected in most instances.[291] However, in some cases (he did not attempt an explanation for the discrepancy) speech may not be affected at all; in other cases, the disturbance of speech might only exist at the 'first invasion', that is, at the onset of the paralysis; thereafter, it

might disappear. Again, without being able to make a generalization suitable for all cases, Abercrombie felt that in cases of paralysis where the person did not lose consciousness, 'the most common [form of attack] is hemiplegia with loss of speech'.(292) Watson held the same view, that frequently, but not always, there might be a loss or at least an impairment of speech in cases of paralysis without coma.(293) If, however, paralysis were accompanied by ramollissement, then an 'embarrassment of speech' was regarded as an automatic consequence,(393) with the person, in the early stages of the condition, being 'unable to speak, or able to speak but imperfectly'. In cases of paralysis in general, it was 'most common' for there to be a 'loss of the memory of words'; however, other semiotic features might be affected, for example a loss of speech-comprehension, but the continuing ability to write, or the consistent substitution of another word for the one intended.(295) The same point is made by Good.(296)

Lastly, in cases of 'mental imbecility', the ability to pronounce words might be affected, but the ability to write might be retained.(297)

2.8 Prognosis in cases of "aphasia"

The question of prognosis in cases of "aphasia" deserves some attention, since directly linked to it is the question of the need for - and indeed the effectiveness of - speech therapy.(298) A somewhat pessimistic picture is painted by Goolden when he states(299) that 'the damage done to the faculty of speech is seldom completely repaired, and very often interferes with proper articulation for the rest of the patient's life'. And, on the basis of the experiences

recounted in these case-reports as well as of later work in the 19th and 20th centuries, this summary is indeed a fair assessment of the situation.(300)

Nevertheless, cases were reported of sudden and total recovery from "aphasia". Thus, a 12 year-old girl, who had contracted typhus and whose speech had been reduced to the single word SINNER, made a complete recovery some months later.(301) Secondly, a 52 year-old man, suffering from insanity, who had remained speechless for the previous 30 years - we are not told what had made him speechless in the first place - made a remarkable recovery about a fortnight before he died, to the extent that his speech became completely normal.(302) Another case was of a man who made a 'sudden' and inexplicable recovery from "aphasia".(303) Fourthly, a sudden emotional jolt was enough to cause speech to return to one 19 year-old girl in whom brain-damage had been diagnosed.(304) An 18 year-old woman, who had become speechless following a series of epileptic fits, regained her speech after vomiting.(305) Equally unusual was the case of a 51 year-old woman who had been 'dumb' for the previous sixteen years and who suddenly recovered her speech after vomiting 'something fleshy in appearance'.(306)

Whatever the exact etiology of these six cases (and the possibility of psychiatric as distinct from purely organic causes cannot be ruled out and in some of them seems highly likely), other cases were reported in which speech was regained, albeit in a less dramatic manner. For example, an 83 year-old man who became speechless and who 'thought he heard 500 people talking at once' recovered within a few days.(307) Other cases included an 82 year-old woman, who 'talked incoherently'

but who eventually recovered, despite her age.(308) Another elderly person, whose speech had been reduced to the single word YES, nevertheless made a complete recovery.(309)

2.9 Summary and conclusions

In this Chapter, surveying the case-reports and studies of disorders of "language" that were published between 1793 and 1862, it has been shown that no theoretical issue became the focus for the description and discussion of individual cases. Unlike in France, where Bouillaud's views on the nature of speech production and on the localization of speech excited interest, discussion and controversy, the great majority of clinical studies in the British Isles were presented as contributions to the study of medicine or neurology, not to that of neurolinguistics. Thus one finds much more neuropathological and general case-history for each patient than descriptions of the actual linguistic deficits. There were exceptions, however, notably in the work of Jonathan Osborne. It was only with the enormous interest taken in "aphasia" in the 1860s and later that linguistic disturbances deriving from brain pathologies were, as of right, elevated to the status of a clinical syndrome.

Compared with the richer and fuller descriptions of the patients' "language" that one meets in studies undertaken in the later part of the century, these descriptions appear, in general, to be meagre and lacking in any obvious sophistication. One reason for this, however, is the discrepancy between, on the one hand, the type of linguistic theorizing and linguistic analyses that were being carried out by linguists and, on the other, the type of linguistic theory that

neurologists and others making the descriptions of pathological "language" required. Thus, with a few exceptions, the patients' speech was described exclusively in terms of its auditory characteristics; or an attempt was made, instead, to suggest a psycholinguistic explanation for the sort of speech the patients produced.

Inevitably, attention was directed to the patients' speech, since this was, in a sense, the most tangible of the semiotic disturbances. Other aspects, however, which were remarked upon (though with nothing like the same degree of attention) were disturbances of writing, speech-comprehension, gesture, reading and musical abilities. Certain non-intellectual activities involving the speech organs such as swallowing and moving the tongue in different directions around the mouth were commented upon, but these were already well established test-features in the analysis of a patient's general motor functioning. The existence in embryo of the distinction between aphasia and dysarthria was, nevertheless, intuitively appreciated.

A key-word that would seem to describe much of the material in these studies is <u>range</u>. A range of semiotic disturbances was noted. Patients ranged in age from young children to elderly geriatrics. The patients came from a very wide range of socio-economic groups. There was clearly no one cause of "aphasia" but a whole range of them.

A second key-word in any overview of this period must be <u>unusualness</u>. One senses in the reports that the authors felt unable to explain in a totally adequate manner the disorders they were describing. They could list the patients' symptoms, describe the other types of problems that were associated with them, but in attempting to sum up the condition

were compelled to resort to a criterion such as 'loss of the power of speech', which begged as many questions as it answered. Furthermore, there seemed to be nothing predictable about "aphasia". The actual semiotic behaviour seemed to vary from person to person, with few cases being even moderately alike. And added to that was the shifting form of the "aphasia": in normal people, "language" was, to all intents and purposes, constant; in the "aphasics", it could change from day to day or even from hour to hour. Perhaps the phrase that best sums up this feeling of unusualness is Osborne's 'that peculiar kind of deprivation'.

For the moment, then, "aphasia" seemed to defy any rational explanation in terms of what was known about the relationship between language and the brain; it could all be said to be puzzling, even baffling. From the time that Broca's and Jackson's ideas began to influence research into "aphasia" in the British Isles, the subject ceased to be puzzling: it became, instead, 'bizarre', 'difficult' and 'incomprehensible'.

To talk of the 'achievements' of these 70 years would seem an inappropriate epithet. Viewed from an historical perspective, the work carried out should be seen as an example of gradual evolution as new ideas were suggested in the case-studies: there was no sudden event that caused the subject to take a leap forwards. Thus, the relevance of speech (and other modalities) was coming to be appreciated as a diagnostic tool in general medical and neurological studies. One sees too that in a few cases a more integrated view, involving medicine, psychology and linguistics, was being adopted of of the patients' behaviour. Gradually, certain ideas from linguistics

were used in the analysis of the "aphasia". And greater attention was paid to the finer aspects of neuropathology. Certain clinicians realized also that any attempt to explain the nature of "aphasia" required the use of a cognitive, as well as a neurophysiological model of speech production. The cognitive models that were proposed were basically simple, straightforward ones, drawing on non-controversial concepts from psychology and philosophy. The neurophysiological models suffered from the lack of detailed knowledge at this time of the finer, even the microscopic, structure of the nervous system.

Finally, we should note the absence from the case-reports of certain factors which are today taken for granted in the assessment nd treatment of "aphasia". There was no special terminology attaching itself to the condition: hence so far the cover-term "aphasia" has been used for what will later be split into psycholinguistically and clinically distinct entities. For this reason, there were no classificatory systems; the clinicians were handling cases of 'loss of speech', 'forgetfulness of words' etc. And with the exception of a small number of clinicians who attempted to analyse their patients' performances by means of brief tests - getting them to write their names, copy a sentence, and so on - there were no formal or standardized clinical tests that could be used with each patient.(310) Lastly, the patients were regarded quite simply as speakers of (mainly) English: later in the century they would become speakers of English with a certain handedness, with a certain intelligence level and degree of educational attainment. From all of these things certain assumptions would follow about the nature of "language" in relation to the brain.

* * * * * * * * *

A section of this Chapter has been given over to a discussion of Bouillaud's views on the nature of speech production, and on the localization of this faculty. In the following Chapter, the sole topic for discussion will be Broca's views on "language" and "language" localization. The reason is that it was the study of neurolinguistics in France, rather than in the British Isles, that provided certain British clinicians, from the mid-1860s onwards, with a point of view which acted as a focus of particular theoretical interest in their work on "aphasia". Broca's work, like that of Bouillaud, cannot be summarized in the space of a sentence or two: it contains many subtleties - some of which were appreciated by British clinicians - and therefore deserves to be considered comprehensively.

NOTES TO CHAPTER 2

(1) One might add, incidentally, that of the authors whose work has been examined, some showed an interest in other forms of speech disorder. Erasmus Darwin, in addition to describing cases of "aphasia" and stammering (Darwin 1794:I,189, 192-193), mentioned a case of cleft palate speech; he also made some remarks on the use of a prosthesis in such circumstances (Darwin 1796:II,95-96).

John Abercrombie included in one of his notebooks the following remark on the treatment of cleft palate: 'Fill up cleft by inducing granulations by touching it frequently with a lancet or some stimulant wash - begin this early'. (Abercrombie, c.1805-1844: Vol. 14, n.p. [under 'Cogenite Diseases']).

Evidence of the interest shown by various people in the 18th and early 19th centuries in glossectomized speech can be found in Goold (1822:I,471-475).

Hall (1836:160) described the case of a woman with a 'spasmodic tic', which he attributed to disease of the spinal motor nerves, resulting in 'very indistinct articulation', including the incorrect pronunciation of /s/ and /θ/.

Charles Bell (1836:397) reported a case which at first sight might appear to have been an 'articulatory' problem: a clergyman who was seized by a 'sudden incapacity' which prevented him from speaking 'especially in a word beginning with G or B; and when a sentence begins with a vowel'; the problem had first appeared in childhood. This may well have been a stammer, but, if so, it is curious that Bell did not describe it as such. Another of Bell's cases, that of a man whose speech was 'interrupted without any assignable cause' and who could not 'propel the breath' may have been a stammerer, although there is insufficient detail in the actual report to allow one to make a certain diagnosis. That the man also had difficulty in swallowing would suggest he may have suffered from dysarthria.

(2) Romberg 1854:I,365; see also 1853:II,331-333.

(3) Abercrombie 1828:375.

(4) Bell, C. 1836:394.

(5) Lefevre, G. 1844:112. See also the remarks on four cases of voice disorder in Webster, J. 1832. Some well may have been of neurological origin. Only Graves (1843:690-691) has anything to say about how hoarse voice may be treated.

(6) Rockey 1978, 1980.

(7) Cf. Rockey 1980:132-139.

(8) Hall 1836:155.

(9) Hall 1841:190.

(10) Parry 1825:257. Gairdner (1866-1867:2) refers to a study of right hemiplegia and speechlessness made 'long ago' by 'Dr. Parry of Bath'. I have been unable to confirm whether Gairdner was referring to Caleb Hillier Parry (1755-1822), the author of the remarks above on stammering, who lived in Bath from 1779 until his death, or to another Dr. Parry, for example, Dr. Charles Henry Parry. On Caleb Hillier Parry, see DNBc:1598-1599.

(11) Cf. Rockey 1980:198-217. The view of Marshall Hall was that treatment, when the condition was not regarded as 'hereditary or inveterate', should involve improving the person's 'general health ... and a habit of self-possession', and that the form of speech to be encouraged should be that of 'speaking in a subdued, continuous tone, first dilating the thorax' (Hall 1841:190-191). Under certain circumstances, the use of 'purgative and tonic medicines' was recommended (Op.cit.:190; cf. also Hall 1836:155. See also Appendix C.2.1.)

(12) See Appendix A for further details.

(13) For a discussion of the phrenologists' findings in relation to the question of "language" localization, see sub-section 2.6.3.

(14) For further details of his life and work, see Br.Med.J. i, 1864: 162; Med.Times & Gaz. i, 1864:132; Dubl.Quart.J.Med.Sci. 37, 1864:249-251.

(15) See, for example, Craig, J. 1836:348; Sayle 1845:63; Steele 1845:361; Jaccoud 1876:390; Kussmaul 1878:788-789; Bateman 1889:218; Bastian 1898:345.

(16) He was regarded by his colleagues as a 'distinguished classical scholar' who 'spoke Latin with fluency, and possessed a great knowledge of Greek' (Br.Med.J. i, 1864:162). These abilities may explain (or help to explain) his awareness of the need for "aphasia" to be studied in a systematic fashion by disciplines other than medicine.

(17) In may other case-reports, social and topographical information about the "aphasic" and his surroundings, which are in no way relevant to an understanding of the actual case, are presented as if they had a bearing on the interpretation of the data. In Osborne's paper, no such irrelevances are permitted.

(18) 'The combinations of syllables introduce difficulties, arising from the new positions which the parts are forced to assume in changing from one to another, and to these are to be added, the peculiarities of accent and quantity.' (Osborne 1834:166).

(19) Op.cit.:160.

(20) Op.cit.:161.

(21) The place of origin of the patients has been determined on the basis of any information supplied in the actual report, or, where this was lacking, from where the author was known to have been living at the time the report was written. It has been possible to ascertain the latter in most cases without difficulty from entries for the individual authors in either the DNB, Munk's Roll (Brown, G.H. 1955), Parr's Lives (Power, D'A. et al. 1930), or from obituaries published elsewhere, for example in the medical journals.

(22) See Appendix A under Jones, R. (1809), Watson, J.A.D. (1815), Hennen (1818), Jackson, S. (1829), Andral (1833), Roboüam (1834), Otto (1834), De Fouchy (1836), Magendie (1837), Belhomme (1845), Sedillot (1856), Schroeder van der Kolk (1859).

(23) In the latter connection, see note 45.

(24) See sub-section 2.3.6.

(25) Chapter 4, sub-section 4.4.1.

(26) Geschwind, in the preface to Kertesz 1979:xiii.

(27) Abercrombie 1828:277.

(28) Possibly James Johnson (1777-1845), who practised in London for many years (see Dubl.Q.J.Med.Sci. i, 1846:275-276).

(29) Westminster Medical Society 1838:308.

(30) Copland 1858:1364.

(31) Cheyne 1812:145.

(32) Dunn 1849:107. Robert Dunn (1799-1877) worked in London and specialised in obstetrics (see DNBc:590 and West, C. 1879: 22-24). It would seem, then, that amongst his non-obstetric cases, apoplexy occurred fairly often.

(33) Goolden 1853:77.

(34) Copeman 1845: 3. He actually says there were 250, but his case numbers 236-239 refer to the same person.

(35) During the period 1892-1906 a number of studies were carried out in Europe and elsewhere into the incidence of speech disorders, mainly amongst the childhood population, and statistics exist for various cities in Belgium (Daniel 1903, Rouma 1906), Czechoslovakia (Schleissner 1905), Denmark (Westergaard 1898), Germany (Gutzmann 1892), Hungary (v.Sarbó 1901), the Netherlands (Vereeniging Volksonderwijs 1904), Poland (Oźtuszewski 1903), and Switzerland (Wagner 1896). But only that by Oźtuszewski provides any firm evidence about the occurrence of aphasia. He found that of the 1752 people with speech problems who had passed through the Warschauer Heilanstalt für Sprachstörungen between 1892 and 1902, a little more than 2½% were cases of 'Aphasie bei Erwachsenen' (Oźtuszewski 1903:39-40); the number of childhood cases of aphasia was greater - nearly 20% of the total. (Such a high proportion of childhood cases, compared, for example, with just over 50% of the total for stammerers, strongly suggests that Oźtuszewski may have been using the term 'Aphasie' in a wider sense than that of 'aphasia'.)

Makuen, in an account of the 200 cases of speech disorder which he had treated in one of the hospitals in Philadelphia (Makuen 1897), points out that 70% of his total case-load were stammerers, and the remainder were made up of 'all the other varieties of vocal and speech deficiencies of which I have any knowledge' (Op.cit.:247). Amongst these 30% were presumably some aphasics.

In 1852, Eduard Schmalz, whose professional work as a speech therapist took him to Belgium, Germany, Hungary, Italy, Poland and Russia, reported that he had seen a number of adults suffering from 'Schwach- und Blödsinn' - just over 13% of his total of 700 patients (Schmalz 1852:92). He felt that this figure was low and not representative of the occurrence of these conditions generally, the reason being that the prognosis for improvement was regarded by the patients' relatives as being poor: 'Wegen älterer Personen bin ich wahrscheinlich weniger befragt worden, weil deren Angehörige überzeugt zu sein glaubten, dass bei ihnen Nichts mehr zu thun sei, oder wenigstens dass deren Sprache ohne Berücksichtigung des Gehirnleidens nicht zu bessern sei' (Op.cit.:92-93).

The Surgeon-General's Index-Catalogue (Billings 1911:XVI, 231) lists a further study that might have thrown light on the incidence of "aphasia": 'Beiträge zur Statistik der Sprachstörungen' by F[elix] Schleissner, ostensibly published in the Med-päd. Monatss.f.d.ges.Sprachh. 13, 1903. It cannot be traced. The pages in question in the journal contain an article by J. Karth on the treatment of deafness. (I am grateful to the staff of the National Library in Bethesda for their lengthy help in trying to find Schleissner's article.)

(36) This is only a sample of the occupations that are listed in the case-reports.

(36a) Sayle 1845:63.

(37) A problematical term in any discussion of the 'causes' of aphasia is 'apoplexy', since it was used in two senses: as a precursor of the more recent term 'cerebro-vascular accident' and, secondly, as the name for a set of symptoms. The ambiguity in its usage was well recognized. Thus, Copeman wrote that the term was used as a descriptive label for 'a particular assemblage of symptoms' such as a sudden physical collapse, the loss of motion or sensation in certain parts of the body, and noisy, stertorous breathing; whilst, on the other hand, it was used for a 'specific disease' (Copeman 1845:1).

(38) A1: Trauma

Trephining: O'Halloran 1793:194-196.
Fall from a horse: Op.cit.:140.
Industrial injury: Op.cit.:279.
Criminal assault:

Op.cit.:287; Brodie 1828 (=Hawkins 1865: III,50); Syme 1833 (=1836:17); Crampton 1833:37; Roboüam 1834:189; Otto 1834:574; Browne 1836:164 [Case 2]; Smith, G.L. and Niddrie, D. 1839:155.
Gun-shot wound: Abernethy 1797:56; Hennen 1818:332-335; Turchetti 1844:452.

A2: Apoplexy

Apoplexy: Cheyne 1812:4; Abernethy 1815:19-21; Abercrombie 1818b:554-557; Cooke 1820:160, 167; Basset 1824: 29; N. 1825:410; Nicol 1826:617; Bell, C. 1827: 85; Abercrombie 1845:76, 267; Edinburgh University Clinic 1830:497; Osborne 1834:159; Cowan 1838:291; Watson, T. 1842:184, 1843:473, 480; Sayle 1845:63; Goolden 1853:77-78; Dunn 1855a:560; Winslow 1860:500.

Stroke: Watson,R.1818:II,385, 418; Bright 1837:303.

Congestion: Hall 1836:98.

Haemorrhagy: Belhomme 1845:63 (cf. Winslow 1860:498).

A3: Inflammation/Meningitis

Inflammation: Abercrombie 1818a:271; Abercrombie 1828:15.

Meningitis: Abercrombie 1828:57.

A4: Convulsions

Watson, J.A.D. 1815:304; Abercrombie 1818a:299; Abercrombie 1819b:485; Ellis, A. 1835:134; Duncan 1849:628; Graves 1851:1-3.

(38) (Contd.)

A5: Sun-stroke

Abercrombie 1819a:6-7 (cf. also Abercrombie 1828:155).

B1: Delirium/Insanity

Delirium: Abercrombie 1830:142.

History of spectral illusions: Craig, J. 1836:334.

Insanity: Browne 1833:331-332; Fletcher 1833:326-328.

B2: Emotional Shock

Hysterical mutism: Levison 1843:252.

Near-drowning: Dunn 1845:536. (See also the accounts of 'aphonia spasmodica' in Smyth 1790:489-495, and the further account in Wells 1790: 501-504.)

C1: Severe Bronchitis

Dunn 1854:712.

C2: Bad Cough

Ramskill 1862:680.

C3: Gastric and Intestinal Disturbances

Gastro-entiritis: Osborne 1834:158-159.

Intestinal [disturbance]: Gibson, D. 1862:139.

C4: Fever

Fever: Abercrombie 1818a:327; Abercrombie 1828:135.

Typhoid fever: Chambers 1846:541.

C5: Sexual Exertions

Crichton 1798:372 (cf also Winslow 1860:507).

C6: Pregnancy and Postnatal Conditions

Jones, R. 1809:282; Cheyne 1812:89; Stanley 1828:531; Gibson, W. 1836:516; Stark 1842:324. (Amongst the papers of John Abercrombie is part of a letter, dated 6 August 1811, to him from Elizabeth Baillie (i.e. Lady Ross Baillie) of Bonnington, enclosing a report on a 22 year-old woman. About a fortnight after giving birth to a child, 'she began to speak incoherently.' Abercrombie, in his reply to Lady Baillie, diagnosed the condition as one of 'puerperal mania' (Abercrombie c. 1805-1844: Vol. 13, n.p.).)

(38) (Contd.)

C7: Excessive alcohol consumption

Cross 1816:121.

D1: Quasi-delirium tremens

Chambers 1846:540.

D2: Public speaking

Cheyne 1812:119; Hytchie 1840:344.

D3: Unknown

Graves 1843:688 (cf. Winslow 1860:519-520).

(39) Bateman 1870a:104.

(40) He described the patients as having been 'speechless', or having 'faultered in his speech', or as having given 'incoherent answers' or 'spoke[n] thick' (Dease 1778:177, 120, 122, 141, 207, 238, 242, 248, 255-256).

(41) Bateman 1890:257-258.

(42) DNBc:129.

(43) DNBc:219.

(44) DNBc:230.

(45) Hennen 1818:332-335. He did, however, note that speech problems arising from battle-wounds were by no means uncommon (Op.cit.: 331, 357). (The case of "aphasia" described by Richard Jones (1809), an Army physician, concerned a pregnant woman; that by J.A.D. Watson (1815) concerned a man taken ill on board a naval vessel. In both cases, no traumatic injury was involved.)

(46) Of the many textbooks and commentaries on different aspects of neurology (in the sense of neuroanatomy, neurophysiology and neuropathology) that were published in the course of the 19th century, only a small minority make any reference to "language" or to its neural bases. In a way, this is hardly surprising since up until the 1860s neurolinguistics had not become a matter of concern to practising doctors as a whole; there were more essential matters to deal with. Thus, John Gordon, in his Observations on the Structure of the Brain ... (1817) never once refers to "language", although the work itself considers in some detail several of the claims made by Gall and Spurzheim for the localization of particular mental and moral functions in specific areas of the brain. Equally, Alexander Walker (1834) devotes some twenty-six pages to a description and discussion of the process of hearing (pp. 189-214), but, like Gordon, is silent on "language". Likewise

(46) (Contd.)

J.S. Waugh (1838), who nevertheless deals with the subjects of smell, sight, taste, touch, memory, etc. (pp. 113-172). Samuel Solly, a noted neurologist of his day, says nothing whatever about "language" in the first edition (1836) of his The Human Brain, Its Configuration, Structure, Development, and Physiology; in the second edition (1847) he inserts a single sentence on the role played by the olives in speech production (p.332). It would seem that these and other authors (Sawrey 1815, Swan 1822, Earle 1833, Clark 1836, Shaw, A. 1839, Mayo 1842, Todd 1845, Lee 1848, Davey 1858, Noble 1858, Brown-Séquard 1860) did not regard the subject of "language" as being significant enough for either the neurologist or the general medical practitioner to make himself familiar with what it encompassed and with how it might be affected by neurological damage. (The following works, in chronological order, have been consulted for the above statement: Bell, C. 1802, Sawrey 1815, Gordon 1817, Cooke 1820, Swan 1822, Earle 1833, Walker, A. 1834, Bell,C.1836, Clark 1836, Solly, S. 1836, Waugh 1838, Shaw, A. 1839, Mayo 1842, Lefevre, G. 1844, Todd 1845, Noble, D. 1846, Solly, S. 1847, Lee 1848, Kirkes & Paget 1851, Swan 1854, Davey 1858, Noble, D. 1858, Schroeder van der Kolk 1859, Brown-Séquard 1860, Marshall, J. 1860.)

(47) Steele 1845:357.

(48) Müller, J. 1838:1044.

(49) Kirkes & Paget 1851:513.

(50) Dunn 1857 (1856-1858):361.

(51) Dunn 1861b:196.

(52) Laycock 1860:I, 92-93. The source of this quotation is James Ferrier (1856:13).

(53) See sub-section 1.8.1 and sub-section 1.8.4.

(54) See sub-sections 4.6.1 and 4.6.2.

(55) An interesting exception is a case reported by Hennen (1818: 337) of a French soldier who, following a head injury, 'formed a new language for himself. He expressed affirmation, not by "Oui," but by the words "Baba". Negatives he gave by "Lala;" and his wants he made known by the terms "Dada," and "Tata." These sounds bore no analogy to the words properly expressive of his ideas'. (Hennen borrowed this description from an account by the French surgeon Larrey.)

(56) There are a few remaining characterisations of the patients' difficulties, which do not fall easily into the categories of either auditory description or psycholinguistic explanation. Thus: 'unable to answer' (Powell 1815:230), 'speaking with great labour and difficulty' (O'Halloran 1793:287), 'difficulty in getting out her words' (Abercrombie 1818a:277), and 'could not articulate a word' (Abercrombie 1818b:565; 1828:271).

(57) The OED defines 'thick' in this context as 'With confused and indistinct articulation', and gives mostly 16th and 17th century references for it, implying, no doubt, that by the 19th century the term was falling out of use. This is not so. The term is still used, in certain speech therapy clinics, but more in the sense of slurred, quasi-dysarthric in quality.

(58) Abercrombie 1818a:271, 327; 1828:15.

(59) Anon. 1829:356.

(60) Duncan 1849. Peter Martin Duncan (1821-1891) was later to become Professor of Geology at King's College, London (see DNBc:2408).

(61) Duncan 1849:628-629.

(62) See sub-section 1.6.2.

(63) Abercrombie 1828:277-278.

(64) Cf. also Cowan 1838:291; Müller 1838:I, 836; Kilgour 1845:149.

(65) Shapter 1837:318.

(66) See also sub-section 2.2.2.

(67) Osborne 1834:158-159, 161-162, 164.

(68) In view of the introduction of physiological factors into some of the explanations, a better term than 'psycholinguistic', despite its novelty and cumbersomeness, would be 'psychophysiolinguistic'.

(69) Heberden, W. 1806:34.

(70) Another explanation would be that, given the degree of illiteracy amongst the population of the British Isles during the 19th century, some clinicians might have decided that to try to assess the degree of damage to the writing capacity would have been inappropriate.

(71) Anon. 1824:735; Winslow 1860:510.

(72) Winslow 1860:521. See also Grattan 1835:769.

(73) Abercrombie 1818b:555-556; cf. Osborne 1834:158-159; Grattan 1835:769; Dunn 1845:537; Steele 1845:356; Goolden 1853:78.

(74) Jackson, S. 1829:332.

(75) Abercrombie 1818b:555-556; cf. also Craig 1836:339.

(76) Osborne 1834:160-162; Winslow 1860:511 and 520. This is a case supposedly reported first by Thomas Beddoes. But there is no mention of it in any of Beddoes' published work.

(77) Winslow 1860:520.

(78) This is the only example during the whole of the period 1793 to 1862 of a patient's actual written work. During the 1860s, lithograph reproductions of the actual writing, not, as here, a reduction to a printed format, were included with case-reports. (See, e.g., Scoresby - Jackson 1867a: Plates I - VI.)

(79) Crichton 1798:375-376; cf. Winslow 1860:508-509.

(80) Wernicke 1874. A translation and over-view of Wernicke's works on aphasia is provided by Eggert 1977.

(81) Bastian 1887b:934.

(82) Bastian 1869b:224.

(83) Op.cit.:478.

(84) Geschwind 1974:46.

(85) Eggert 1977:20. In her bibliography, however, Eggert refers only to the first part of Bastian's 1869b paper. Certain sections of it do read as though Bastian were describing a disturbance of speech-comprehension, but he was, in fact, referring to the comprehension of written language (see, especially 1869b:215-216).

(86) Kertesz 1979:126.

(87) Meyer 1974:570.

(88) Baillarger 1865:266.

(89) For example, it could refer to a psychotic disturbance.

(90) Baillarger's paper is referred to by Mirallié (1896:20). Bonvicini (1929:1572-1573) quotes passages from various 17th and 18th century authors to show that sensory aphasia had been recognized well before the 1860s.

(91) Brodie 1854:48. See also pp. 50 and 55.

(92) A lack of any disturbance of speech-comprehension is expressly mentioned by the following: Jones, R. 1809:282; Cheyne 1812:4, 135; Watson, R. 1818:II, 418; Abercrombie 1818b:565-66; Combe, G. 1824:244; Hood 1824:238, 1825:83; Nicol 1826:624, 626; Abercrombie 1828:259-60; Jackson, S. 1829:332; Watson, H.C. 1830:103; Osborne 1834:158-162; Grattan 1835:769; Syme 1836: 17, 19; Westminster Medical Society 1838:307-08; Stark 1842:324; Cheyne 1845:204-05; Chambers 1846:541; Brodie 1854:48, 50, 55; Sedillot 1856:516-17; Dunn 1862:571; Welby 1864:34; Wilks 1864: 251; Holthouse 1865:366; Courties 1865:268; Gairdner 1865-68 : 94; Moxon 1866:482 488; Anderson, J.K. 1866:368; Russell, J. 1866:567; Robertson, A. 1866-67:505; Fox 1866:145; Ogle, W. 1867a:11; Scoresby-Jackson 1867a:581; Scoresby-Jackson 1867b: 706; Thurnam 1867:23; Jackson, J.H. 1867-68:372; Jackson, J.H. 1868d:359.

At this point (1869), Bastian's paper was published, but to what extent clinicians were conversant with his views is a debatable question. The list of works in which the topic of speech-comprehension was expressly commented upon continues, up until 1875 (the year following the publication of Wernicke's important monograph), with the following: Callender 1869:21; Ogle, J.W. 1860:Cases 24, 37; Watson, T. 1871:I, 495; Bristowe 1871b:215, 217-218, 221-224, 226-227, 231; Anderson, M. 1871:447; Bristowe 1872:21; Wilks 1872:145; McCarthy 1872:706; Arnould 1873:339; Jones, C.H. 1874:372; Ogle, J.W. 1874a:441; Jackson, J.H. 1874c:804; Forster 1874:44; Little 1875:176; Clouston 1875: 421-422. An example of a German case-report which antedates Schmidt (1871), but not Meynert (1866), is Leyden 1867:78.

(93) Browne, in his tabulation of the nine 'forms of diseased language' (Browne 1834:423), has three categories which may refer to defects of comprehension, although his wording and the accompanying commentary do not provide incontrovertible evidence on this point: (i) 'impaired perception of the relations of words to the things signified' (ii) 'total loss of perception of the relations of words to each other' (iii) 'total loss of perception of these relations'. The first quotation could refer to the process of mis-naming, the second to grammatical errors, and the third to agrammaticality.

(94) An autopathographical account of loss of speech-comprehension, even earlier than Cheyne, is to be found in Beddoes 1802:48. However, this describes the patient's condition prior to an epileptic attack and not specifically in the context of "aphasia": 'There are moments, when my ear finds no reasonable sense in the words that are spoken'. (See also Op.cit.:62, and Heberden, W. 1806:159.)

(95) Mott 1916:xxi.

(96) Abercrombie 1828:234.

(97) Abercrombie 1828:234. Details of the case are repeated in Abercrombie 1845:229-230.

(98) Powell 1815:230.

(99) Nicol 1826:618-619; Gregory 1834:161; Osborne 1834:161; Dunn 1845:537; Chambers 1846:542; Winslow 1860:508-509.

(100) Dunn: loc.cit.

(101) Abercrombie 1818b:565-566; Jackson, S. 1829:332; Sedillot 1856:516.

(102) Abernethy 1797, Cooper 1824, Nicol 1826, Anon. 1829, Abercrombie 1830, Osborne 1834, Craig, J. 1836, Shapter 1837, Cheyne 1843, Chambers 1846, Holland 1852.

(103) Abernethy 1797:56-57; cf. Abernethy 1815:70-71 and Abercrombie 1830:142.

(104) Holland 1852:146.

(105) Cheyne 1843:79.

(106) Abercrombie 1830:142. Cf. also a similar case in Cooper 1824:255 A Scottish "aphasic" is reported as having been able to sing in Gaelic, although his English was badly affected. (There is no indication, however, as to whether his spoken Gaelic was also affected.) (Nicol 1826:620).

(107) Abercrombie: loc.cit.; cf. Good 1834:136. Cooper 1824:255 relates an identical case of a male Welsh/English bilingual.

(108) Abercrombie 1830:142-143.

(109) I distinguish here between a language that is acquired without the aid of any formal, school-room tuition, and one that is learned as a result of tuition.

(110) Anon. 1829:356-357.

(111) Brain damage was found at autopsy.

(112) Abercrombie 1830:143-144.

(113) Abercrombie 1830:144.

(114) Cheyne 1843:79.

(115) Abercrombie 1830:144.

(116) We are not told about his Italian and German.

(117) Osborne 1834:160-162.

(118) Craig, J. 1836:348-349.

(119) Shapter 1837:314.

(120) Chambers 1846:540.

(121) Cf. Chapter 4, note (493).

(122) Osborne 1834:161.

(123) Grattan 1835:769.

(124) Steele 1845:356. See also Nicol 1826:619-620.

(125) Nicol 1826:620, 626; Osborne 1834:161; Grattan 1835:770; Steele 1845:357.

(126) Otto 1834:574. See also Nicol 1826:620, 626.

(127) Crichton 1798:358-359.

(128) This comparison of pathological speech and otherwise normal speech under specific conditions may be the source of Jackson's remarks on slips of the tongue, etc. See Chapter 5, sub-section 5.4.6.

(129) Osborne 1834:158. It might be argued that this second category refers to dysarthria; this seems unlikely on the grounds that, by using the verb LOSE in reference to the capacity to operate the vocal apparatus, Osborne is referring to a psychological factor.

(130) Craig 1836:363.

(131) Steele 1845:357.

(132) Cf. sub-section 2.6.3.

(133) Op.cit.:358.

(134) Op.cit.:359.

(135) The closeness, in both theory and terminology, to Jackson's 'Expression' (Jackson, J.H. 1864f; see sub-section 5.4.2) strongly suggests that either Jackson was aware of this paper by Steele and used his ideas, or else that Steele's view had become part of the everyday currency for the discussion of speech disorders amongst clinicians in the following twenty years; there is certainly no further reference to him or his work in any of the intervening literature.

(136) Steele 1845:366.

(137) Op.cit.:367.

(138) Bishop, J. 1847.

(139) Op.cit.:515.

(140) Even now, given the enormous advances in neurophysiology since the mid 19th century, such a neurophysiological model is still lacking, although certain aspects of it have been studied.

(141) See sub-sections1.4.2 and 1.8.11.

(142) Lefevre, G. 1844:112.

(143) It is not easy to discover the reason for this concentration on the larynx in those works which purport to describe how speech is produced. Any of the following possible reasons may be the relevant one: (i) the larynx is more compact and easier to dissect than the mouth, nose and pharynx; (ii) the larynx is traditionally associated with the act of respiration and therefore, albeit indirectly, with the maintenance of life; (iii) the larynx is logically prior to the mouth etc. in any chronological account of the speaking process; (iv) the physiology of the vocal folds attracted considerable attention from physiologists and physicists alike in the 18th and 19th centuries, and this aspect of medicine, as set out in the 18th century textbooks, simply lingered on.

(144) Richerand 1812:452-455.

(145) Bell, C. 1832:303-306.

(146) Müller 1838:1002-1019.

(147) Kirkes & Paget 1851:502-506.

(148) Bell, C. 1832:300-308.

(149) Op.cit.:308.

(150) Op.cit.:311.

(151) See sub-section 2.6.7.

(152) Bell, C. 1821:401. It is debatable whether in all of these latter activities precisely the same sets of muscles are used as in speaking.

(153) Cf. Head 1926:I, 3-29.

(154) Broca's views on "language" localization are dealt with in Chapter 3.

(155) Cheyne was not the first British clinician to describe the neuropathology of "aphasia". In 1775, Percivall Pott had set out his findings in a case of head-injury which had led to 'some difficulty in pronunciation' (Pott 1775:166).

(156) Baillie 1813:9.

(157) Abernethy 1815:19-21.

(158) Powell 1815:216, 220-223, 229-230.

(159) Abercrombie 1818a:277; 1818b:555-556, 557, 563-564, 565-566, 566.

(160) Abercrombie 1819a:20. See below, sub-section 2.6.7.1.

(161) Westminster Medical Society 1838:308.

(162) Browne 1833:331-332. But see also Browne 1834.

(163) Abercrombie 1828:267.

(164) Turchetti 1844.

(165) Op.cit.:452.

(166) Steele 1845:367-368.

(167) Abercrombie 1830:154-155.

(168) Abercrombie 1828:400-402.

(169) Op.cit.:331-333.

(170) Abercrombie 1818b:557; 1828:215-216.

(171) Watson, T. 1843: I, 364.

(172) Ogle, J.W. 1859:320.

(173) See sub-section 4 .8.10.

(174) Bell, C. 1821:398. Cf. also McMenemey 1960:606.

(175) Loc.cit.

(176) Op.cit.:607.

(177) Peterson 1978:8. The total number of medical men (i.e. physicians, surgeons and apothecaries) practising in England in 1850 has been put at 14,700.

(178) Ibid.

(179) The main source of information I have consulted, apart from the original texts, is McHenry 1969. Other works have included Alper 1960, Clarke & O'Malley 1968, Fulton 1953, Kesert 1963, Lewy 1942, Martin 1966, McMenemey 1960, Merritt 1959, Meyer 1971, Mönkemöller 1907, Riese 1959, Russell, K.F. 1963, Somers 1956 and Spillane 1981.

(180) Sayle 1845:63.

(181) Gale 1961: 32.

(182) Clarke & O'Malley 1968:830.

(183) Tebay 1848:260.

(184) Abercrombie 1818b:503.

(185) Op.cit.:563-564.

(186) Op.cit.:565-566.

(187) Ferrier, D. 1874b:30. Even on a seemingly fundamental topic, namely the division of the hemispheres into lobes, one cannot be absolutely certain of where the dividing-lines between the lobes were meant to be. Today's standard division of the hemisphere into four lobes (or five if one counts the insula) is a comparatively recent development in neuroanatomy, dating from the second half of the 19th century. Prior to that, a number of different schemata were used. Willis, in 1664, divided the hemisphere into only two lobes; Varolino, in 1573, however, had three; Chaussier, in 1807, had either three or four (cf. Meyer 1971:122, 133); but Gratiolet, in 1854, set up five lobes (op.cit.: 122-123; Clarke & O'Malley 1968:403). Many 19th century diagrams of the brain show the ventral surface, with the anterior lobes labelled as such, the temporal lobes as the 'middle lobes', and the remainder of the cerebrum as the posterior lobes. Hence, one cannot be certain whether the term 'posterior lobe' is used in the autopsy reports on "aphasics" for the occipital or the parietal lobe. Definitions of the cerebral territory such as one finds in Andrew Combe's The Principles of Physiology (1834:224) are plainly quite unhelpful in resolving this question: the 'anterior lobe ... occupies the forehead', the 'middle lobe ... all the portion of brain lying above and a little in front of the ears' and the 'posterior ... that part that fills the back part of the head'.

(188) Cheyne 1812:137-141.

(189) Phrenology acquired many converts, especially in Scotland (see de Giustino 1975). On the background to phrenology in relation to neurology, see Ackerknecht & Vallois 1956.

(190) Ackerknecht & Vallois 1956:21, 26, 82-83, 85.

(191) Combe, G. 1824:246.

(192) Cull 1844:145. In both cases, the localization was bi-lateral.

(193) Hood 1825:85; Roboüam 1834:189; Gibson, W. 1836:516; Hytchie 1840:345; Levison 1843:252. In one description (Trevelyan 1841:55), the site is simply described as 'the Organ of Language': one must presume that this referred to the supra-orbital area.

(194) Stark 1842:324.

(195) Browne 1834:253-254; Smith, G.L. & Niddrie, D. 1839:155.

(196) Hood 1826:28-29.

(197) Nicol 1826:623.

(198) Syme 1836:19. Admittedly, the author of the report was a professional surgeon, James Syme, professor of surgery at Edinburgh University, but the phrenological stamp of approval was given to a shortened version of his paper by its being reprinted in the Phrenological Journal and Miscellany (1836:17-20) without comment: as if it reflected the correctness of the traditional phrenological view-point.

(199) Kilgour 1845:149.

(200) See sub-section 2.6.2.6.

(201) See below, sub-sections 2.6.5 and 2.6.6.

(202) See Chapter 3.

(203) The often limited information on each patient makes it impossible to be certain that only speech was involved.

(204) Abercrombie 1819b:498.

(205) Op.cit.:499.

(206) Abercrombie 1828:259-260.

(207) Bright 1831:II, i, 268.

(208) Abercrombie 1818b:565.

(209) Tebay 1848:260.

(210) Abercrombie 1828:83.

(211) Op.cit.:78.

(212) Abercrombie 1819a:13; 1828:274.

(213) Abercrombie 1818b:565; 1819a:11.

(214) Powell 1815:216.

(215) See below, sub-section 4.8.

(216) Winslow 1860:532.

(217) The subject of left hemiplegia in relation to "aphasia" is dealt with in sub-section 4.10.

(218) Brain 1965:34.

(219) Ferrier, D. 1878:13.

(220) Goldstein 1948:104.

(221) McHenry 1969:356.

(222) Head 1926:I, 13-18. Young, R.M. (1970:137-142) relies, unfortunately, mainly on Head's summary; he admits that he had not read the original French works.

(223) The work in question is 1825a,b, 1827a,b, 1839-40, 1847-48a,b, 1864-65a,b.

(224) He concerns himself exclusively with speaking; nothing whatever is said about comprehension or writing etc. Therefore, the term 'speech' will be used where previously I have used "language".

(225) Op.cit.:43.

(226) Loc.cit.

(227) Op.cit.:30.

(228) Loc.cit.

(229) Op.cit.:43

(230) Op.cit.:34-35, [Case VII].

(231) Bouillaud 1825b:284.

(232) Op.cit.:285.

(233) Op.cit.:289-290.

(234) Bouillaud 1826:27.

(235) Op.cit.:28.

(236) Bouillaud 1827a, b are slightly tangential, in that in them Bouillaud argues that the control of posture and leg movement lies in the cerebellum,whereas 'le cerveau coordonne certains mouvemens, ceux de la parole en particulier' (p. 84). 1830 deals mainly with the results of animal experiments on the functions of the frontal lobes.

(237) Bouillaud 1839-1840:284.

(238) Cf. Bouillaud 1826 and, later, 1847-48a, b, for example.

(239) See Bouillaud 1847-48a, b.

(240) Bouillaud 1847b:807.

(241) Holland 1839:165.

(242) Dunn 1857(1856-1858):363.

(243) Holland: loc.cit.

(244) Henry (1834:67) mentions, without any critical comment however, the views of both Gall and Bouillaud.

(245) Watson, T. 1843:521.

(246) The Phrenological Journal (1845:81) quoted Bouillaud's view with obvious pleasure since it provided general confirmation of the phrenological view-point - or so it might have seemed (see above sub-section 2.6.3).

(247) Powell 1815:216.

(248) Abercrombie 1819a:13.

(249) Tebay 1848:260.

(250) Winslow 1860:500.

(251) Hall 1836:35.

(252) Bouillaud himself answered his critics: see Bouillaud 1826, 1839-40, 1847-48a, b.

(253) Noble 1846:169-171.

(254) Goolden 1853:78.

(255) Winslow 1860:497-500.

(256) Op.cit.:500.

(257) Abercrombie 1819b:498.

(258) Abercrombie 1819b:504.

(259) Cheyne 1812:138-139; Abernethy 1815:19-21; Abercrombie 1828: 86-88; Craig, J. 1836:352; Abercrombie 1845:76-77; Sayle 1845: 63 (bis).

(260) Abercrombie 1819a:20.

(261) Allowance has been made for the somewhat varying application of the term 'corpus striatum' (cf. Brodal 1969:180). I have taken it, when considering these reports, in its widest sense to include not only the caudate nucleus, putamen and globus pallidus, but also the claustrum. Whether it should be extended even further such that it is synonymous with the basal ganglia (itself a fairly late 19th century term - cf. Coats, J. 1875-77:355) and therefore the substantia nigra, the red nucleus and the subthalamic nucleus, is debatable.

(262) Abercrombie 1819b, 1828, 1830, 1845.

(263) Bright 1831:1. He cites three cases. In the first, a case of a 23 year-old man whose speech had become 'very defective' and had deteriorated thereafter, and who also had had difficulty in swallowing, both corpora striata were found to be diseased, the left more so than the right (Bright 1831:296, 299). In the second, that of a 48 year-old man, who was 'unable to speak intelligibly' and who also suffered from a right hemiplegia, the left corpus striatum was more softened than the right (Op.cit.:299-301). The third case, a 55 year-old man, was one in which 'speech became embarrassed and his recollection was greatly impaired'; there were other linguistic symptoms too. Bright commented that 'a great part of the symptoms probably arose from the derangement of the circulation rather than from the organic lesion of the substance of the brain ... yet here we found both articulation and deglutition particularly disturbed, in a case where the corpora striata were chiefly diseased' (Op.cit.:617-619). The first two cases quoted above are, in fact, the first published accounts of the symptoms of what was later to be called pseudo-bulbar palsy (cf. Lewy 1942:10-11).

(264) Dunn 1857:366.

(265) Dunn 1862a:571.

(266) Bright (1837:306) and Dunn (1850:25) presume, although no post-mortem was performed, that the corpora striata were the source of the linguistic disturbance.

(267) Bright 1831:II, i, 296-299, 299-301; 1831:II, ii, 617-619.

(268) Romberg 1853:II, 429.

(269) Cheyne 1812:110-115, 138-139; Bright 1831:II, ii, 613 (see also Copeman 1845:131-132); Bright 1837b:303-306; Turchetti 1844: 452-453; Sayle 1845:63; Bennett, J.R. 1849:157-160; Todd 1854: 245-248; Dunn 1855a:560.

(270) Schroeder van der Kolk 1859:148-169 for details.

(271) Op.cit.:149.

(272) Winslow 1860:501-503.

(273) Schroeder van der Kolk also singled out other parts of the nervous system as constituents of the speech production process: the medulla and the ganglionic cells in the nuclei of the hypoglossal and accessory nerves (Op.cit.:167). It is of interest, too, to note that Sheppard (1848:416) had defined the self-same ganglia as the 'seat of consciousness' but had never once mentioned "language" in this connection.

(274) Dunn (1854:712) emphasized in any case the need for a brain autopsy to be carried out whenever a person had suffered "language" disturbances that could, on other evidence, be attributed to brain damage.

(275) Basset 1824:29.

(276) Bell, C. 1827:106.

(277) Copland 1850:37. Cf. also Bell, C. 1827:87-96; Bell, C. 1836: 396; Magendie 1837:465; Shapter 1837:319; Duncan 1849:629.

(278) Bright 1837b:306-308.

(279) Dunn 1850:25.

(280) Cf. Cooke 1820:160, 167.

(281) Cheyne 1812:11. This assertion unfortunately does not square with the cases of apoplexy that he described! Of his 23 cases, only 11 appear, from what he says of them, to have involved a disturbance of speech.

(282) Abercrombie 1818b:554.

(283) Watson, T. 1843:472. In 1842:184 he had described a case of apoplexy leading to considerable linguistic disturbances.

(284) Op.cit.:480.

(285) In Abercrombie 1828:15 eight symptoms are listed; in the reprint (with additions) of 1845, an extra symptom, that of disturbance of 'the organs of touch', is added to the list.

(286) Abercrombie 1818a:272.

(287) Abercrombie 1828:15. He also now regarded only a reduced tempo, not an accelerated one, as being of diagnostic significance. Cf. also the comments in Reynolds, J.R. 1855:104.

(288) Hall 1841:276.

(289) Belhomme 1845:65.

(290) Abercrombie 1819a:1.

(291) This may be compared with Heberden's view that 'a faltering and inarticulation of the voice' was a warning of approaching palsy (Heberden 1806:342).

(292) Abercrombie 1818b:592; cf. also 1828:245.

(293) Watson, T. 1843:496.

(294) Abercrombie 1828:270.

(295) Abercrombie 1828:277-278.

(296) Good 1834:476.

(297) Good 1834:135. Browne's view, in any case, was that all cases of "aphasia" should be seen as instances of insanity (Browne 1833:331-332).

(298) On the latter, see Appendix C.

(299) Goolden 153:78.

(300) One should, nevertheless, note Heberden's slightly more optimistic view (Heberden 1806:348) that recovery from "aphasia" might be fast or slow, with the 'smaller words' coming back first, 'as if it were a language which they had once known, but by long disuse had almost forgotten'.

(301) Chambers 1846:541.

(302) Winslow 1860:533, quoting a case first described by the French clinician, de Boismort.

(303) Westminster Medical Society 1838:307-308. It was suggested by one doctor that the man may have been malingering. See p. 146 of this thesis for further comment.

(304) Dunn 1845:588.

(305) Ellis, A. 1835:134.

(306) Anon. 1835:134. As this case, reported in the Lancet, is taken from a provincial newspaper report, perhaps too much credence should not be given to it!

(307) Cheyne 1812:83.

(308) Abercrombie 1818b:560.

(309) Westminster Medical Society 1838:307. For other cases, see Cross 1816:121-123; Sedillot 1856:516-517; Winslow 1860:511, 520-521; Gibson, D. 1862:139; Ramskill 1862:680.

(310) This topic is discussed in Appendix C, sub-section C.1.

CHAPTER 3

BROCA'S CONCEPT OF APHEMIA: A THEORY FOR NEUROLINGUISTICS?

NOTES FOR CHAPTER 3 ARE BETWEEN
PAGES 238 AND 243

3.1 General

The importance of Paul Broca (1824-1880) in the field of "language" pathology cannot be underestimated. Compared with the contributions to the subject made by his contemporaries in France, it was Broca's work that lent a sudden impetus to the renewed interest in the question of "language" localization, and in turn influenced the direction of clinical studies of "aphasia" being undertaken by certain doctors in the British Isles. For this reason, it is important to know what Broca actually said - and, equally, did not say - about "aphasia".

Much has been attributed to him. It is claimed that he determined the location of the lesion that 'disrupt[s]the capacity for articulated speech',(1) that he 'discovered the motor speech centre'(2) or the 'center for "articulated language"',(3) 'the centre for speech'(4) or 'a center for speech',(5) or even the 'faculty of language'.(6) He is, furthermore, credited with discovering the area of the brain that, when damaged, leads to 'reduced word output, poor articulation and disturbed rhythm'.(7) None of these attributions is, however, strictly speaking, correct. Goldstein(8) and Pillsbury & Meader(9) come closest to an accurate summary of his discoveries when they say that Broca indicated the 'likelihood of articulate speech' or the 'motor coordinating centre' being located in the left inferior frontal gyrus.(10)

Broca's work on "aphasia" was but a small part of his many and varied academic interests. His published work covers a wide spectrum including general anatomy, neuroanatomy, physical and social anthropology,(11) linguistics, neurology, pathology, physiology and surgery.

(His work on linguistic topics, namely Breton (1879), Basque (1864f, 1868a, 1875a), Polynesian languages (1860) and the relationship of anthropology to linguistics (1862)[12] is discussed in Appendix B.) Excluding any unsigned contributions to the medical journals, his total output over 35 years exceeded 500 papers,[13] of which twenty-four dealt with "aphasia", and six with linguistic matters. The bulk of his studies of "aphasia" were carried out in the period 1861-1869; thereafter, like Jackson, he gradually turned his attention to other concerns as he felt that his ideas on "aphasia" were being more and more misunderstood.

There have been numerous commentaries on his life and work.[14] Of particular relevance to this thesis is the fact that little has been said hitherto about his work in linguistics. Pozzi[15] refers only once to the subject and omits any mention of Basque. Fletcher,[16] however, notes that 'Among the more important of these contributions [i.e. Broca's published writings] may be mentioned his paper on Linguistics and Anthropology'. Nor has there been any extended discussion in print of his contribution to the theory of "aphasia". His name and a brief (and often incomplete) summary of the main points of his work will be found in many textbooks, both medical and linguistic.[17] Slightly more detailed summaries can be found in Weisenburg & McBride,[18] Brain,[19] and Maruszewski.[20] To date, the fullest discussion is that by Head,[21] which provides succinct commentaries on the various papers on "aphasia", but fails to tackle the central question, namely the precise characteristics of the neuro-linguistic theory that Broca established in order to describe the symptoms of his various patients.[22]

In my opinion, what has not been adequately appreciated is the importance that Broca attached to the need for a neurolinguistic theory. To rectify this imbalance, the traditional method of discussing Broca's work by means of a chronological exposition of his cases will be avoided, and instead emphasis will be placed on the more theoretical aspects of his work on "aphasia".

A few words are necessary first, however, about his style. He epitomized the concept of the dedicated and utterly altruistic scientist, paying as much attention to counter-examples to his hypotheses as to those that merely confirmed them. For him, what mattered above all else was to get at the truth of a situation by means of a careful analysis of the facts; the hypothesis would then be rigorously tested. Goldstein sums up this aspect of his work when he writes of Broca's 'extraordinary cautiousness',(23) reflected on many occasions in his published work when he appears simply unable to make up his mind about the interpretation of some fact or facts. For example, in his discussion of the possibility of the right hemisphere playing some part in "language" production, he appears to prevaricate almost to the point of uncertainty - but this was characteristic of the man. It is hardly surprising, therefore, that some of his contemporaries, perhaps less inclined in the ways of the intensely careful, cautious scientist, failed to appreciate exactly what he was saying, and consequently abbreviated and distorted it to the point at which their interpretation was scarcely in line with Broca's original conception. The belief that Broca localized "speech" in the left inferior frontal gyrus is a case in point.

3.2 Origins of Broca's neurolinguistic studies

The origins of Broca's interest in neurolinguistics - at least as evidenced by his published work - lie in a subject apparently unrelated to it. In February 1861, at a meeting of the Société d'Anthropologie, Gratiolet had discussed the significance of the volume of the human skull for the interpretation of a person's intellectual capacities. His colleague, Auburtin, opposed this point of view. A few weeks later, Broca joined in the further discussion of the topic,(24) especially since it had been widened to take account of an old, vexed problem: whether the brain acted as a single, integrative unit, or whether, instead, it should be regarded as a collection of independent 'organs' controlling different aspects of physical and mental behaviour. In the course of the discussion, Auburtin demonstrated from one of his clinical cases that in the frontal lobes lay 'la faculté de coordonner les mouvements propres au langage', echoing word for word the views of his father-in-law, Bouillaud.

Broca's curiosity was aroused. It so happened that shortly after Auburtin's paper to the Société, Broca had under his care a middle-aged man called Leborgne, who, some 21 years earlier, had begun to lose 'l'usage de la parole'.(25) As a result, he was able to produce only either the single syllable 'tan' or a reduplicated form 'tan tan'. Some ten years later, he began to lose the movement of his right arm, and his sight started to fail. When Broca saw him for the first time, a week before his death, Leborgne had nevertheless retained almost perfect comprehension of speech, his facial and lingual muscles were not paralyzed (unlike his right arm), and all his other psychological

and physiological functions were normal.

Post-mortem examination of the brain revealed that almost all of the left frontal lobe had become softened, and apart from the gyri of the orbital pole (where partial atrophy had set in but the overall shape of the gyri had been retained), most of the remainder had been destroyed. This left 'une grande cavité, capable do loger un oeuf de poule, et remplie de sérosité'.(26) Broca, after discussing the question of where the damage that had caused the other deficits was located, concluded that 'la lésion du lobe frontal a été la cause de la perte de la parole'.(27) This view coincided exactly with what Bouillaud had been saying for well over 35 years.(28)

In the following months and years, Broca was to examine other patients, and on the basis of his own research and that of colleagues, was to establish a new and important syndrome in clinical neurology. To this, in August 1861, he gave the name 'aphémie'.(29) Later, Trousseau was to rename it 'aphasie' and extend its definition quite considerably.

3.3 Neurolinguistics in France in the early 1860s

A question that might well be asked is why, during the years 1861 to 1865 in France, so much attention should have been paid to neurolinguistics.(30) After all, Bouillaud's contributions to the subject, although immensely important in themselves, had not led to any major surge of interest in the subject in the previous 35 years. The answer, I believe, is to be found in a number of factors. The first must be the forum where most of the discussions of neurolinguistics

took place: at meetings of four major French societies, the Société Anatomique, the Société de Chirurgie, the Société de Biologie and the the Société d'Anthropologie. By virtue of this, the contents of the papers (and of the often heated discussions that followed them) were automatically reported in the French medical journals, thus giving them extensive nation-wide publicity. The second factor was undoubtedly the still imposing presence in French medicine of Bouillaud. As has been discussed earlier in Chapter 2, neurolinguistics was a topic on which he had made important pronouncements in the past, and the fact that his son-in-law, Auburtin, was also interested in the subject must now have added weight to the discussions. Thirdly, one suspects that since the subject was being discussed by some of the most intellectually capable members of the medical profession in France, this would, in the nature of things, have produced more searching examination of the fundamental problems of the subject than if the whole subject had been treated by other less able people, in a less penetrating manner.(31)

3.4 Broca's schema of "language" production

The main statement of Broca's views on how speech and certain other modalities are accomplished is set out in Broca 1861d. He introduces a number of concepts: 'la faculté générale du langage' and its role in relation to speaking, writing and gesture; secondly, a cognitive and neurophysiological model of speech production; and, thirdly, the role of auditory feedback in speech production - although this is no more than hinted at. Key-terms that are used and defined metalinguistically are: 'la faculté générale du langage',

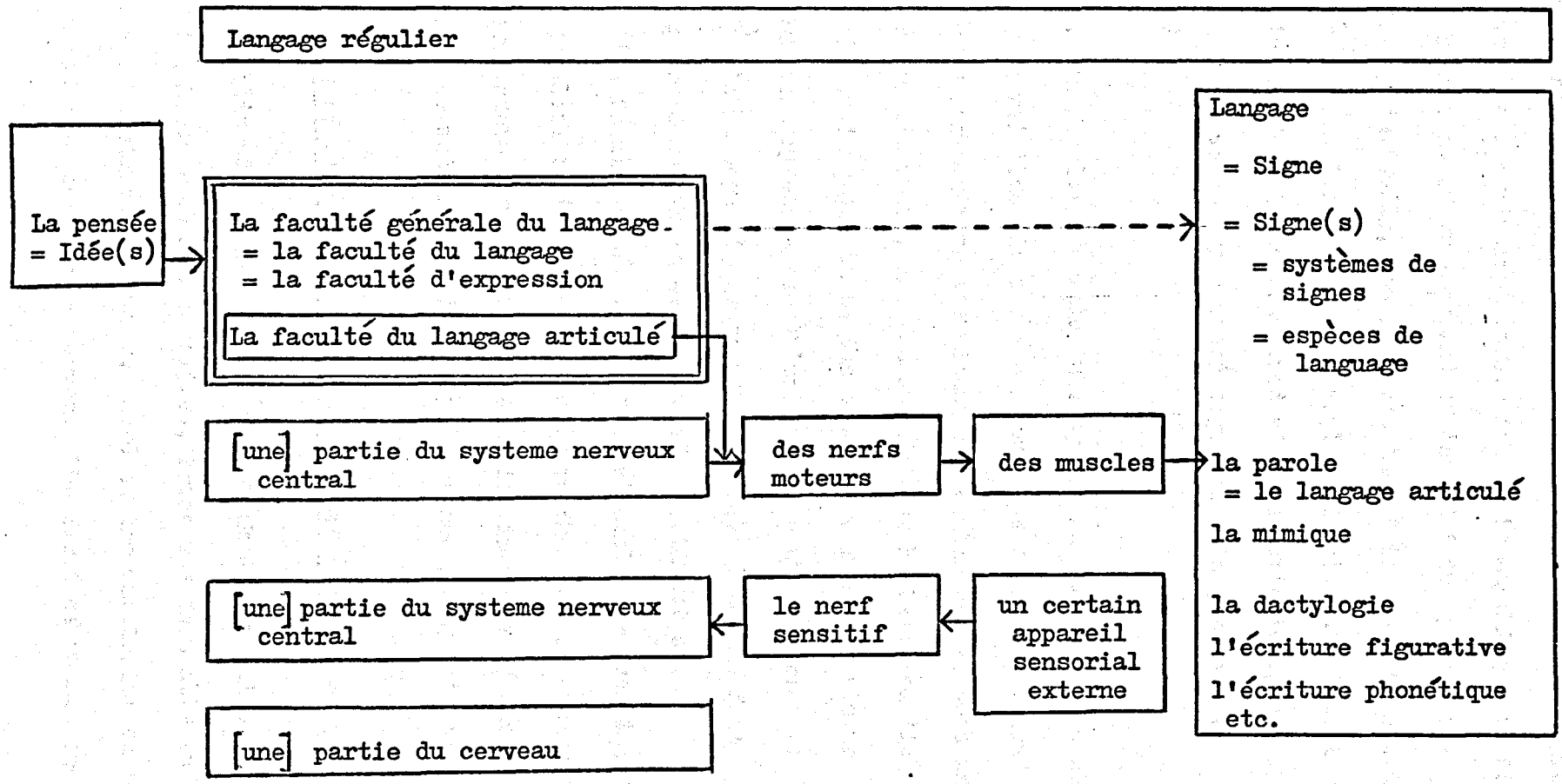
'la faculté du langage articulé', 'le langage', 'le langage régulier', 'les espèces de langage', 'les signes', 'le système de signes'.(32)

In Figure 8 the different stages and concepts associated with the expressive and receptive modalities of "language" have been set out. It will be seen that Broca visualized the process as involving five discrete stages: (i) ideation; (ii) the operation of 'la faculté générale du langage' and at least one other faculty, although these, with the exception of 'la faculté du langage articulé', are not spelt out; (iii) the transmission of information along the motor nerves; (iv) movements of the muscles of the speech organs; (v) the resulting effect - 'le langage'. Reduced to its essential elements, the schema can be summed up as follows. For an idea to be made manifest in the form of speech, writing or gesture, the operation of 'la faculté générale du langage' is obligatory. If an idea is to be represented in speech, then 'la faculté du langage articulé' is also required, the role of this faculty being to act as the coordinator of the necessary muscular movements of the speech organs. Once the coordination of the movements has been organized, information is passed along the motor nerves to the speech organs. These, in turn, move and 'la parole' or one of the other 'espèces de langage' results.

It is crucial to appreciate that the function of 'la faculté du langage articulé' is merely to coordinate movements; it is not involved, for example, in giving an articulatory form to ideas by organising them into a sequence of sounds according to a pre-determined grammatical format. In fact, Broca says nothing whatsoever about how ideas are transformed into the form in which they can then be expressed as

Figure 8

BROCA'S SCHEMA OF THE RELATIONSHIP BETWEEN
IDEAS AND SOUNDS/GESTURES/WRITING
(BROCA 1861d:331-333) (BROCA 1865a; 1888: V,99-100)



a series of coordinated muscular actions. From a 20th century point of view, what is clearly 'missing' in his schema is anything specific about the role of words, of grammar and of 'sounds' in speech production. He does, admittedly, use the term 'mots' in connection with 'la faculté générale du langage', which would indicate that this is what this particular faculty is concerned with: nevertheless, he says nothing about how the words are grouped together into grammatical structures.(33)

If, then, 'la faculté générale du langage' has to do with words, what is the actual relationship between it and the other faculties? From a number of remarks during the discussion of his cases, both in the 1861d paper and elsewhere, one can assume that he believed 'la faculté générale du langage' to be the store of words that (to use a well-worn 20th century expression) 'underlies' a whole series of modalities.(34) As he says at one point about Leborgne, the fact that he could gesture and write even though he could not speak, indicates that 'la faculté générale du langage' must have been intact.(35) One notices a parallel to this view not only in the work of Jackson but also in more modern discussions of "aphasia" in terms of disturbances of performance modalities with competence remaining intact.(36)

3.5 The concepts of aphemia and other speech pathologies

Having established the theoretical framework within which cases of "language" breakdown could be described, Broca was then able to set up a number of distinct syndromes, based on the particular semiotic functions that had been lost or preserved. The first of these, and

the one to which most of his time and energies were devoted, was aphemia. Leborgne, for example, was aphemic, on the grounds that his 'faculté générale du langage' remained unaffected, his hearing was unaffected, all his muscles, apart from those of the larynx and those used in articulation were still under voluntary control, none of the speech musculature was paralysed, his intellectual capacities were unaffected, his comprehension of speech was normal, and sounds could be uttered easily although he had only a small repertoire of sounds at his command. However, when angry he could utter other sounds, even complete words or phrases, and especially oaths. What he lacked was 'la faculté d'articuler les mots': he could not execute a series of coordinated, methodical movements corresponding to the syllable.(37) The proof that Leborgne had not lost his 'faculté du langage', i.e. his 'faculté générale du langage' lay in his ability to understand speech and to read. In addition, says Broca, he had not lost his memory of words or the memory of how to move the muscles of phonation and articulation; what had been impaired was 'la faculté de coordonner les mouvements propres au langage articulé'.(38)

A further example of the defining characteristics of aphemia is to be found in the description of Broca's next patient, Lelong.(39) He suffered no appreciable change in his intellectual capacities, he understood everything that was said to him, there was no lingual paralysis, no dysphagia, and no visual defect. His hearing was normal. He could move voluntarily all of his limbs except his thigh-bone - this had been damaged in an accident unrelated to his neurological condition. Like Leborgne, his sole problem was the inability to articulate certain parts of words. As Broca puts it, 'il n'avait perdu

ni la faculté générale du langage, ni la motilité volontaire des muscles de la phonation et de l'articulation ... il n'avait perdu, par conséquent, que la faculté du langage articulé'.(40) There was, however, one other factor that could not be overlooked and that might seem to have had a bearing on the diagnosis of Lelong's condition: he was restricted to a vocabulary of only five words. This would suggest that his deficit involved more than just the ability to coordinate the necessary muscular movements for speech, but Broca argues against this interpretation, saying that the evidence of retained gestural capacities showed that Lelong knew far more vocabulary than he could actually articulate.

Broca was aware of the fact that not all aphemics were the same: that three different types of the condition could be found. The first of these, of which both Leborgne and Lelong were representatives, was when the patient could produce a short series of syllables, mostly monosyllables; the second when the patient would attempt to speak, but nothing audible would result; and the third when the patient would produce, under normal circumstances, only a single word, but when moved to anger, could produce a second word or even a series of words such as, typically, an oath.

In a later paper (1863d), Broca discussed the differential diagnosis of patients with different linguistic symptoms: were they aphemic or not? At the same time a list of three other syndromes was given, which were to be the subject of closer scrutiny in the course of the next few years. The first of these was a disturbance of thought processes ('de la pensée'); the second a disturbance of the special faculty of coordinating words - 'la faculté spéciale de coordination

des mots'.(41) (It seems likely that Broca was not turning his attention to the question of syntactic as distinct from specialised articulatory disturbances, although he does not refer to this second type of disturbance as being one which affects 'la faculté générale du langage'.) And the third was a disturbance of muscular control, due not, as in aphemia, to some intellectual/psychological deficit,(42) but to a purely mechanical deficiency.(43) It is difficult to be certain what Broca was suggesting here, but he may have been describing the condition that was later to become known as dysarthria.

He quoted, in the same paper, the case of an elderly lady, Anne Perchaud, in order to illustrate some of the problems associated with making a differential diagnosis. But the case is more illuminating of Broca's modus operandi at this stage than of anything else. Linguistically, Mme Perchaud could achieve nothing beyond the level of groans, shouts and confused and completely unintelligible words. Broca's diagnosis of aphemia was based, however, not on the symptoms but on the autopsy findings. Arguing a posteriori, he maintained that since the damage was found to be in the middle and inferior frontal gyri, his earlier diagnosis of senile dementia could not stand. Admittedly, he had enquired of the lady's relatives as to her previous linguistic behaviour (previous to Broca seeing her, that is), and they had confirmed his second diagnosis. That apart, his conclusion can only be regarded as speculative; it certainly did not meet his own normally high standards of clinical assessment and diagnosis.

It is in this paper that one sees a possible serious weakening of his earlier argument (e.g. in 1861d) that the evidence of other 'espèces de langage' which remain unaffected is proof that the aphemic

patient has not lost his 'faculté générale du langage'. He was now saying that the aphemic may indeed lose other 'espèces de langage', and he quoted reading and writing as an example. The logical corollary of this must be - although Broca himself did not raise the possibility - that other modalities such as gesture and speech-comprehension might also be affected. If this is so, then how does one diagnose aphemia in the first place, since if all the other modalities are affected, then it would seem probable that 'la faculté générale du langage' itself might be disturbed? The fact that Broca attributed a simultaneous deficit in writing and reading to the probable topographical proximity of the areas controlling these functions as well as the area controlling 'la faculté du langage articulé' would strongly suggest that the distinction between aphemia as a disturbance of a faculty separate from the 'faculté générale du langage' was becoming less precise than before.(44)

Further evidence that his earlier concept of aphemia was undergoing modification, in fact extensive modification, can be found in a paper on aphemia, published six months later.(45) Here he widened very considerably the scope of the term: 'Ce qui manque aux aphemiques ... ce n'est pas la faculté de prononcer un certain nombre de mots ... ils ont perdu la faculté de combiner leurs mots pour construire de véritables phrases'.(46) Such a statement was strongly reminiscent of his previous one that a different condition from aphemia was one in which the patient had difficulty in joining words together.(47) It seems likely, then, that Broca was now interpreting aphemia as involving some form of syntactic breakdown too. If indeed this was the case, it was only temporary, for by the time of his next paper on

the subject (1864b), he had reverted to his earlier, 'standard' definition of the condition.

Nevertheless, one finds further examples from the 1864-1865 period that show that Broca's ideas were, to a certain extent, at this time, in a state of flux. He noted, for example, that 'la parole' can be completely destroyed by a lesion 8 to 10mm in length, yet if the lesion is ten times larger, there may be only partial interference with 'la faculté du langage articulé';(48) he had no explanation for this. Whereas in the Leborgne and Lelong cases he had maintained that an aphemic's intellectual capacities remain remarkably unaffected by the brain-damage, he was now admitting that in the majority of cases a person's intellectual capacities are decidedly affected.(49) He also began to question whether his assertion of 'la faculté du langage articulé' being in the left hemisphere was in fact correct: he noted that the autopsy on one of Moreau's patients showed that the entire left inferior frontal gyrus and the surrounding area 'faisait défaut', yet the patient had been able to speak 'convenablement, et elle exprimait ses idées sans difficulté'.(50)

One of his last public comments on the subject of aphemia was published in 1869 in La Tribune Médicale, one of the leading French medical periodicals. He may well have chosen this place of publication in order to achieve as wide a circulation as possible of his views, to try to counteract the continual misunderstandings of the nature of aphemia in the minds of many of his medical colleagues: 'ceux qui ont écrit sur le même sujet [d'aphémie] ont plus d'une fois rétabli la confusion que j'avais voulu éviter'. In an attempt to clarify his view-point, he introduced new concepts and new terms. Speech patho-

logies deriving from brain-damage fall, he said, into 'quatre ordres d'affections bien distinctes'. The first was 'alogie', a disturbance of the intellectual faculties. The second was 'amnésie verbale', a condition in which the patient no longer recognises the conventional relations between ideas and words because of a loss of 'la mémoire des mots'. Under certain circumstances, however, the verbal amnesic can understand what is said to him, and can also indicate that he has understood it; but in general he will have forgotten the meanings of words and will not understand any conversations going on round about him. As far as speaking is concerned, he may produce 'des paroles confuses'. The condition Broca was describing was in fact a form of sensory aphasia.(52) The third category of speech pathology was aphemia, defined as in the earliest papers, as a disturbance of 'l'art ... de combiner avec regularité les mouvements délicats des organes de l'articulation'. Unlike the alogic, the aphemic has ideas to express and when speech fails, he can resort to gesture; unlike the verbal amnesic, however, he has not lost the connection between ideas and words. The fourth category, 'alalie mécanique', was the condition in which, because of a mechanical defect in the nerves or parts of the brain that send commands along these nerves, no physical 'power' can reach the muscles. This description resembles what in later years was to be described as dysarthria.(53)

Despite the existence of theoretically clear-cut distinctions between these four categories of speech disorder, Broca was sufficient of a realist to admit that in practice the allocation of a speech condition to any one of them was not necessarily straightforward - for one thing, differing degrees of the four conditions were found.(54)

But what he never admitted is that mixed types could occur: in his opinion, after extensive testing of the patient it would always be possible to make a diagnosis. Yet on the other hand, he did admit that the lesions causing aphemia and those causing verbal amnesia were very probably close to each other - on the grounds that the memory of words must be closely connected to the part of the brain that controls the pronunciation of words.(55) This hint - and it is no more than this, since he had never researched verbal amnesia to the extent he had aphemia - of the possibility of the left inferior frontal gyrus and/or the surrounding brain substance being the area in which the memory of words is located-was reminiscent of his somewhat ambiguous comments on the same subject in 1866b.(56)

3.6 The localization of 'la faculté du langage articulé'

Although he narrowed down quite considerably the area of the brain responsible for aphemia, Broca never felt irrefutably certain, even after making a detailed study of the subject from his own and colleagues' cases, that the location he had selected was ultimately the correct one. Thus, in the eight years in which he commented on the question of localization, the chosen area moved from, in April 1861, the middle of the left frontal lobe, to the middle or the inferior left frontal gyrus, then to the posterior third of the inferior frontal gyrus, then further forward to cover the whole of the same gyrus. By July 1863, he was wondering if the area might not extend into the parietal lobe. By 1864, he was raising the possibility that damage in the right hemisphere might lead to aphemia or at least be partly responsible for it. By 1868 he found himself having to

explain why damage in the insula could produce the same aphemic effects as damage in the left inferior frontal gyrus. And in his last statement on the subject (1868c), he widened the scope of the hypothesis to include not only the posterior half of the left inferior frontal gyrus, but the insula, the 'circonvolution d'enceinte'(57) and also the right hemisphere. One sees then, contrary to what the great majority of commentators have said, that Broca was far from ascribing aphemia exclusively to the left inferior frontal gyrus, and preferred instead to leave open the possibility that other locations might be involved. One notices too that his views shifted on occasions backwards and forwards; consequently, there was always a chance that an opinion expressed by him during a period when his ideas were fluid, might well have been taken by a colleague as being his definitive conclusion.

In his first description of the Leborgne case (1861b - the second was 1861d), he considered the main area of damage to have been the middle of the left frontal lobe; this took into account other damage (to the insula and the lentiform nucleus of the corpus striatum) which, he concluded, had been responsible for Leborgne's right-sided hemiplegia. It is somewhat surprising, therefore, to find that in his review of this same case (1861d), some four months later, the area of damage was now much more circumscribed - although he was not prepared to commit himself finally at this stage: either the middle or the inferior frontal gyrus, but more probably the inferior.(58) Perhaps equally surprising is the implication that the aphemia may not actually be due to cortical but to white matter damage. He wondered if 'la faculté d'articuler les mots' was an intellectual

faculty, in which case it would be found in the 'partie pensante du cerveau',[59] or if, instead, it originated in a locomotor ataxia involving the muscles of articulation. Despite what he had already said about the cortex being involved (middle and/or inferior gyri), he still refused to commit himself by coming down on the side of either an intellectual or a mechanical interpretation of the condition. He seems eventually, however, to have favoured the intellectual, i.e. the cortical, interpretation.[60] A similar sense of uncertainty characterizes his remarks on the Lelong case (1861e), for he admits to being unsure whether the damage lay in the posterior third of the inferior frontal gyrus or else in the equivalent section of the middle as well.[61]

By this time, Broca was aware that the site of the lesion was not the only relevant factor in the localization of the damage causing aphemia. In both the Leborgne and Lelong cases, the damage could be limited to the middle and/or inferior gyri, and yet the linguistic symptoms were not identical.[62] How could this be explained? He ascribed the difference to the <u>type</u>, not the site of the lesion. In Leborgne's case, there had been progressive softening of the damaged area; in Lelong's case, microscopic examination of the damaged tissue revealed the presence of hematine crystals, the result of an apoplectic attack some 18 months earlier. It is unfortunate that Broca never returned to this question of type versus site of lesion in his discussion of other cases in the following years.

During 1862 and the early months of 1863, he was to have the opportunity to study further cases of aphemia. As a result of investigating eight more cases, either personally or from reports supplied

by colleagues, he felt confident enough to be able to state that 'le langage articulé' was located in the posterior third of the left inferior frontal gyrus.(63) Later, the study of two more cases also confirmed this conclusion.(64, 65) And yet a certain contradiction remained: why was it that in both the Leborgne and Lelong cases, the middle left frontal gyrus was held to be involved in the aphemia? Broca never did (or could?) explain why.

By April of the same year, 1863, the posterior third of the left inferior frontal gyrus was being replaced as the site of the lesion in aphemia by the whole of the gyrus. In fact, so confident was he that he ventured to suggest that this gyrus ('le siège précis et circonscrit de la faculté du langage articulé') might be named 'la circonvolution du langage' - and therein lay the seeds of future theoretical and terminological confusion! But he still refused to make up his mind finally until further studies had been carried out to confirm the hypothesis.

At the same time, he raised a quite different issue: whether the frontal gyrus in the right hemisphere might also play a part in 'la faculté du langage articulé'. He appeared to have been led to introduce such a major new consideration into his thinking by the realization that acute problems can and do arise in diagnozing a lesion when other symptoms are present. For example, if a patient suffers a diminution in intellectual abilities as well as a disturbance of 'la faculté du langage [sic!]', then more than the left inferior frontal gyrus might be found, at autopsy, to be diseased: the corpus striatum and the thalamus might very well be affected. In these circumstances, then, to pin-point the source of the aphemia would be

no easy task, and yet 'Ces cas sont nombreux et donnent lieu à de grandes difficultés de diagnostic'.(66)

A solution to the problems raised by such multi-deficit cases would be to investigate cases of aphemia which had resulted from trauma. He reported two such cases, under the care of his colleague Duval, to the Société de Chirurgie, one a man in his thirties, the other a young child, both of whom had become aphemic as a result of trauma.(67) In both cases, postmortems revealed lesions in the left frontal gyrus (and nowhere else). Commenting on the cases,(68) Broca welcomed this further proof of his own hypothesis, but still erred on the side of caution, being unwilling to commit himself irrevocably, as it were: 'Il semble résulter de la que la faculté du langage articulé est localisée dans l'hémisphère gauche du cerveau ou au moins qu'elle dépend principalement de cet hémisphère'.(69) The reason he felt unable to rule out the possibility of right hemisphere involvement was that so far no aphemic had been found to have a right-sided lesion; this did not mean, however, that such a case might never occur, hence his note of caution. In fact, one of Perier's patients seemed to be just the case Broca was looking for. The injury was to the right side of the skull, but the autopsy showed that the brain itself had been damaged quite extensively in the left hemisphere; but there was one locus of damage (in the posterior part of the inferior gyrus) that Broca considered to be the cause of the aphemia. He was quite adamant about this, but gave no reasons.(70)

In the following months, further evidence was gathered in support of the hypothesis of the left inferior frontal gyrus as the site of the lesion, as well as of the accuracy of the linguistic characterization

of the condition. He described his findings in four new cases.(71) In the first, there was a loss of substance in the left frontal gyrus. In the second case, the left inferior frontal gyrus and the insula had undergone softening, and the lentiform nucleus of the corpus striatum had been destroyed.(72) In the third case, softening was found in the left inferior frontal gyrus. It is the fourth case that raised doubts about the validity of the hypothesis. The patient did not reply to questions, she did not understand what was said to her, and her utterances were greatly limited, often being nothing more than repetitions of 'Je veux m'en aller', 'Quel malheur' and 'Mon Dieu, mon Dieu'. Otherwise, for hours on end she would mumble inarticulately, occasionally emitting groaning noises. The root question for Broca was obviously whether she was a case of aphemia or of some other condition. He attributed the woman's relative mutism to a diminution in her intellectual capacities - although he presented no evidence to support this statement. The autopsy data was far from easy to interpret unequivocally. There were two lesions in the left inferior frontal gyrus, the first of atrophy and light diffuse softening in the posterior path of the gyrus, the second of softening, yellowish-brown in colour and limited to the edge of the gyrus alongside the lateral sulcus. But there was also diffuse softening of the inferior gyrus of the temporal lobe. Furthermore, in the insula an abscess had formed in the second sulcus, extending backwards into the white matter, and in the gyri grouped around the lateral sulcus brownish colouring of the brain substance was noticed. Added to this there was slight atrophy and a reduction in weight of the entire left hemisphere. What Broca clearly had to do was to distinguish between the damage that had led to senile decay and the damage that was

responsible for the aphemia. His conclusion, all things considered, was surprisingly curt: '... il est bon de noter cependant que la perte de la parole a coincidé avec une lésion de la troisième circonvolution frontale gauche'.(73) He never explained, however, on what basis he was able to rule out of consideration the other areas of brain damage.

His contributions to the discussion of actual cases of aphemia became fewer in the next few years: in the space of three years he reported only three more cases, one of which was a summary of an earlier case.(74) Taking the place, however, of case-reports were more general summaries of his views on the nature of aphemia, and of the localization of the area responsible for 'la faculté du langage articulé'. In a lengthy paper read to the Société d'Anthropologie (1865a), he defined aphemia in the same terms as before: 'la perte de la parole sans paralysie des organes de l'articulation et sans destruction de l'intelligence'.(75) He also expounded what has since become known as perhaps his most famous dictum in this field of study: 'nous parlons avec l'hémisphère gauche',(76) a view which, on the evidence he had presented thus far, was not completely tenable, since in his earlier studies he had raised the possibility of the right hemisphere playing some part in 'la faculté du langage articulé', and so far he had not retracted or explained this possibility more closely. Indeed, in this self-same paper, he pointed out that the left hemisphere was not necessarily the exclusive site of the faculty: very occasionally (he gave 5% as a figure) right-sided lesions could cause aphemia.(77)

Another paper read to the Société d'Anthropologie (1866a) deserves attention, if only because of the terminology that was used,

terminology that could well have been the source of so much of the confusion surrounding his hypothesis. He stated quite firmly that in the left inferior frontal gyrus was located 'la faculté du langage':(78) clearly a reference not to 'la faculté du langage articulé', but to the other faculty about which he had so far said little, 'la faculté générale du langage'. Adding to the suggestion that his views had undergone a radical change is the statement that the left inferior frontal gyrus 'est le siège de l'un des éléments indispensables de la fonction du langage articulé'. Which element was it, and what others were involved? Until now, he had restricted his views on localization to the faculty that coordinated the necessary muscular movements. Further evidence to suggest that this paper represented a major shift in his views was his comment that it is highly probable that the left inferior frontal gyrus is also involved in other aspects of "language", not just 'la faculté du langage articulé'.(79) And yet, in his next paper, 1866b, in which he discussed a case of traumatic aphasia (not aphemia), the posterior third of the inferior gyrus, 'l'organe du langage articulé', remained unscathed, despite enormous lesions in the left frontal lobe as a whole.(80) From this, one presumes that his views at this stage were again in a state of flux.

Similarly, in the next of his papers to refer to the topic of localization of "language", his contribution to the British Association meeting at Norwich (1868b),(81) he described the left inferior frontal gyrus as being the seat of 'articulate language'.(82) He did, however, extend the area of the brain that was held to be responsible for 'articulate language'. As one of the reports of the meeting said, he

'particularly drew attention to cases of aphemia from disease of the Island of Reil with integrity of what we may call Broca's convolution. In these cases, however, the "convolution of articulate language" is cut off from the corpus striatum, and thus is practically destroyed so far as utterance of words goes'.(83) As Broca himself pointed out in a later summary of his work on "language" (1868c), these particular cases were in a small minority of 5% of all cases of aphemia. (Furthermore, however, he increased somewhat the area involved in 'la faculté du langage articulé' when he stated that the damage causing aphemia might lie outwith the left inferior frontal gyrus, in the 'circonvolution d'enceinte'.)(84) In the remaining 95% of cases, 'la faculté du langage articulé' lies along the superior edge of the lateral sulcus, opposite the insula and occupying the posterior half or perhaps even only the posterior third of the left inferior frontal gyrus. At the same time, he referred once more to the possibility that the right hemisphere might be involved in this 'faculté', but on the evidence available to date he was not able to reach a definite conclusion about it. In any case, as he again emphasized, what he was localizing was 'la faculte coordinatrice du langage articulé'; he was not localizing any other aspect of the communication process.

That his ideas would be misunderstood and unwittingly extended to the point at which people assumed he was localizing 'speech' itself - words and all - is hardly surprising. His French term 'langage articule' and an English translation such as 'articulate speech' or 'articulate language' imply the total process of vocal communication. Broca realized the source of the misinterpretation of his ideas, for on occasions he used a different term to refer to 'la faculté du langage articulé': he called it 'la faculté d'articuler les mots',

thus making clear that he was dealing not with words or with any other linguistic and psychological features of speech but with the means by which words were expressed as a series of muscular commands. Even so, it was inevitable that anyone who had not followed the development of his arguments ab initio might have seriously misinterpreted the import of 'la faculté du langage articulé'. An English gloss such as 'motor speech centre' does, after all, suggest that far more than the coordinating mechanism of muscular commands is involved.(85)

3.7 The terminology of aphemia and aphasia

Early in 1864, an exchange of views took place between Trousseau and Broca about the most appropriate term to use for what Broca had been calling 'aphémie'. Trousseau objected to 'aphémie' on etymological grounds, particularly since a Greek-speaking colleague had been shocked to learn that Broca had (or so it seemed) derived the word from the Classical Greek form ἄφημος , meaning 'infamous'. Broca responded by reminding Trousseau that some words have changed their meanings since Classical Greek times. Trousseau also objected that in Greek the negative particle ἀ cannot be attached to the 1st person singular form of a verb, only to a noun. Broca, however, refused to recant, happily pointing out that the word 'aphasie' was actually composed of a negative element together with an ambiguous noun φάσις , which in turn was derived either from the verb φάω 'I shine' (which, of course, in this context would be irrelevant), or else from an archaic, reconstructed form *φάω 'I speak' - 'verbe fossile, qui disparut avant l'organisation de la langue grèque'. Adding a little salt to the wound, he reminded Trousseau that his noun root φάσια 'ne se trouve pas dans les dictionnaires'!(86)

In the end, as we know, Trousseau's term 'aphasie' won the day, and Broca's 'aphémie' was gradually neglected.(87) But much more important than the squabble over the etymologies of the two words was the fact that Trousseau used 'aphasie' firstly as a replacement for 'aphémie', but then extended its meaning to cover all the other aspects of a speech disorder that Broca had assiduously attempted to assign to other categories. Broca himself objected to his term 'aphémie' being taken as a straight synonym for 'aphasie', since Trousseau was using it not only for 'aphémie' but also for verbal amnesia, transitory cerebral dysfunctions and for those cases in which no certain diagnosis could be made. As a result, 'Il a ainsi rétabli dans la pathologie du langage une partie des confusions que j'avais cherché à dissiper'.(88) By 1865, nevertheless, the term 'aphasie' had established itself in the Continental literatures on speech disorders, and Broca found himself being cited as an authority on the localization of such conditions as amnesia, an area that, with one exception(89) he had carefully declined to discuss.

3.8 Summary and conclusions

The subject of neurolinguistics - or strictly speaking one particular aspect of it - engaged Broca's attention for more than nine years: the years 1861-1869 were the most fruitful in terms of the description and discussion of cases and the formulation of hypotheses. Although he referred occasionally to matters connected with syntax, vocabulary, reading, writing and gesture, almost the whole of his work was concerned with one aspect of the speech production process, namely the faculty of coordinating the necessary muscular movements. Despite

his use of the term 'le langage articulé' this was a totally physiological concept; nowhere did he discuss it in terms of phonetics, of particular types of sounds or different stages in the speech production process (initiation, phonation and articulation).

A lesion of 'la faculté du langage articulé' causes aphemia, one of the four categories of speech pathology that Broca established - the others were alogia, verbal amnesia and mechanical alalia. In today's terminology, aphemia and verbal amnesia constitute expressive aphasia.

He set up three types of aphemia on the basis of the characteristic acoustic output of the speaker.

On the question of localization, he appeared to favour as the locus of the damage that causes aphemia, the posterior third of the left inferior frontal gyrus, although the evidence of autopsies indicated that a wider area, involving the white matter of the cortex between the inferior frontal gyrus and as medial as the corpus striatum, might also, if damaged, be involved. With the development in the 1870s of a more precise knowledge of the finer anatomical pathways between the cortex and the brain-stem structures, the reason for the existence of a wider area of potentially aphemic brain tissue became obvious. Broca's view that more than the inferior frontal gyrus may be responsible for aphemia was borne out by the researches into aphasia by, amongst others, British doctors from the mid-1860s onwards (see Chapter 4).

Broca's views cannot be said to constitute a theory for neurolinguistics as a whole. At best, they form a well established hypothesis on the localization of one particular aspect of the process of speech

production; they have no bearing at all on the localization of other aspects of speech production or of other modalities.

In the following Chapter, it will be shown how Broca's hypothesis, whilst frequently misunderstood, nevertheless acted as a focus of attention for those doctors in the British Isles who studied the interrelationship of language and the brain. Ironically, it was to be his deliberately limited concept of neurolinguistics rather than the native and grander neurolinguistic theorizing of Hughlings Jackson that was to influence the course of much of the discussion of aphasia from the mid-1860s onwards.

NOTES TO CHAPTER 3

(1) Dimond 1972:164.

(2) Guthrie 1945:273.

(3) Weisenburg & McBride 1935:8.

(4) Campbell 1905:221.

(5) Boring 1950:70.

(6) Young, R.M. 1970:142.

(7) Espir & Rose 1976:49.

(8) Goldstein 1948:199.

(9) Pillsbury & Meader 1928:37.

(10) The claim that Marc Dax reached the same conclusion as Broca, but much earlier, in 1836, has been discussed at length, e.g. by Critchley 1964a, 1965. A note to the effect that Broca had failed to find any evidence in support of this claim was published in the Lancet (i, 1877:815).

(11) Much of this was translated into Russian (cf. Pozzi 1880:604).

(12) This too was translated into Russian (Pozzi 1880:602).

(13) Pozzi (1880:592-608, reproduced in Huard 1961:60-86) lists 514 altogether. Even so, Pozzi's list is, on his own admission, incomplete. It does not include, for example, Broca's paper on "aphasia" at the meeting of the British Association for the Advancement of Science in Norwich (Broca 1868b). To my knowledge, there is as yet no definitive listing of his entire output.

(14) The following have been consulted: Anon. 1880a, 1880-81, Arquiola 1976, Ball, B. 1880, Boring 1950, Boynt 1964, Brain 1961, C. 1880, Clarke, E. 1970, Critchley 1961, Fletcher 1882, Genty 1935, Goldstein 1970, Head 1926, Huard 1961, Joynt 1961, Maruszewski 1975, Pozzi 1880, Riese 1947, 1961, Riese & Hoff 1950, 1951, Schiller 1963, 1979, Weisenburg & McBride 1935, Wilkins, R.H. 1964, Young, R.M. 1970, Zaborowski 1882.

(15) Pozzi 1880:582.

(16) Fletcher 1882:24.

(17) E.g. Guthrie 1945:273, Dimond 1972:164, Akmajian et al. 1979:307-308.

(18) Weisenburg and McBride 1935:8-9.

(19) Brain 1965:34-35.

(20) Maruszewski 1975:21-22.

(21) Head 1926:13-29.

(22) Schiller (1979:165-211) provides a highly readable account of Broca's work on "aphasia", but, like the other commentators, does not go into much theoretical discussion.

(23) Goldstein 1948:199.

(24) Broca 1861a.

(25) Broca 1861b:235.

(26) 1861b:237.

(27) Op. cit.:238.

(28) Cf. Chapter 2, sub-section 2.6.5.

(29) Broca 1861d:332.

(30) Between April and June 1865, for example, eleven weekly meetings of the Académie impériale de Médecine were given over, in the main, to the discussion of "language" localization (see Bull. Acad. imp. Méd. 1865:575-890). The transcripts of the actual papers and discussions ran to over 230 pages!

(31) A parallel to this in the British Isles is the way in which, from the 1860s onwards, "aphasia" engaged the minds of some of the intellectual giants of British medicine, such as Hughlings Jackson and David Ferrier.

(32) Where there is no possibility of ambiguity, Broca's French terms have been translated: thus, 'émission' and 'réception' become 'production' and 'reception'. But otherwise, terms like 'langage', 'parole', 'faculté générale du langage' etc. have been left in the original. It is my contention that much of the misunderstanding of Broca's work and the erroneous concepts that have developed from it stem either from a cursory reading of the French original, or from a misleading translation. For example, 'le langage' cannot be translated directly into English as 'language'.

(33) 1861d:331-333.

(34) Cf. Kraetschmer 1980:6.

(35) 1861d:331.

(36) Cf., for example, Weigl & Bierwisch 1970.

(37) 1861d:333. Broca may be suggesting here that speech is programmed in terms of whole syllables, not individual sounds.

(38) 1861d:333. At this point Broca quotes Bouillaud in support of his hypothesis. Yet Bouillaud's 'organe du langage articulé' cannot be equated completely with Broca's 'faculté du langage articulé', since, for Bouillaud, more than the coordination of muscular movements was implied by his term, (see page 165 of this thesis).

(39) Broca 1861e.

(40) 1861e:402.

(41) Broca 1863d:394.

(42) The import of this is explained below, page 224.

(43) 1863d:394.

(44) 1863d:396.

(45) 1864a.

(46) 1864a. (1888:V,64.)

(47) 1863d:394.

(48) 1865a. (1888:V,93.)

(49) Loc.cit.

(50) Loc.cit. He noted too that children have the capacity to switch functions from one side of the body to the other following brain-damage, for example, by learning to use the left hand for writing, but this does not mean that a disturbance to an adult brain would have the same linguistic effect as it would to a child's (Op.cit. (1888:V,96.)).

(51) 1869. (1888:V,118.)

(52) See page 129 in connection with Bastian and Wernicke.

(53) Earlier, at the Norwich meeting, Broca had described these four categories (see B.M.J. ii, 1868:259) in more or less the same way as in his French paper. As an example of how misinterpretations can so easily arise, in the report in the Medical Times & Gazette, (ii, 1868:276) the term 'alogia' is described as the successor to 'Broca's aphemia' and 'Trousseau's aphasia' (which it clearly is not); in the British Medical Journal report, 'aphemia' is defined as a 'defect in the special faculty of language'!

(54) For example, partial versus total loss of the memory of words. In this connection, we can note that he treats the 'a-' prefix in words like alogia and aphemia as referring to both partial and total loss of function, (1869, (1888:V,118)).

(55) 1869. (1888:V,124-125.)

(56) 1866b:397.

(57) According to Meyer (1971:134), the 'circonvolution d'enceinte' would seem to be the operculum. However, much more than this is encompassed by the term. Schiller (1979:190-191), who elsewhere (p.198) glosses it as 'Foville's gyrus surrounding the Sylvian fissure', makes clear that the 'circonvolution d'enceinte' was 'practically the speech area as most of us see it today, the "Sylvian region".' That is, it took in the inferior frontal gyrus, the supramarginal gyrus and the superior temporal gyrus.

(58) 1861d:357.

(59) Op.cit.:335.

(60) He was helped to this conclusion by the evidence of articulatory defects in young children's speech. Children, he says, have to develop a particular memory of the necessary movements used in articulating words. He refers on only one other occasion to this 'psychological' interpretation of aphemia, (1866a. (1888:V,107, 109)).

(61) Op.cit.:106.

(62) See above, page 220.

(63) 1863a. (1888:V,44.)

(64) Op.cit.:208. (1888:V,46.)

(65) In Broca 1863b (1888:V,62), there is a reference to a communication by Broca to the Société de Biologie on the subject of aphemia, on 17 January 1863. I have been unable to trace this item.

(66) 1863d:394.

(67) Broca 1864b:54-55.

(68) Broca 1864c.

(69) 1864c. (1888:V,77.) He was not suggesting that the whole of the left hemisphere played a part in 'la faculté du langage articulé'. The context of the paragraph from which this quotation has been taken is one in which Broca is making the general point that a left-sided lesion is apparently responsible for aphemia, not, as some of his colleagues believed, a lesion in any area of the brain, be it left or right hemisphere, or even both.

(70) Broca 1864d.

(71) Broca 1864e. See also 1864d for one of these, a patient of Charcot's.

(72) He offered no explanation for why more than the left inferior frontal gyrus was damaged.

(73) 1864e. (1888:V,83.)

(74) 1865a,b, 1866a.

(75) 1865a. (1888:V,85.)

(76) 1865a. (1888:V,90.)

(77) 1865a. (1888:V,87.)

(78) 1866a. (1888:V,105.)

(79) 1866a. (1888:V,105.) Cf. also Broca 1875b. (1888:V,131.)

(80) 1866b. (1888:V,111.)

(81) No verbatim text of his paper exists. The British Medical Journal and the Medical Times & Gazette carried summaries which, although not identical, nevertheless happily complemented each other in terms of the subject-matter covered.

(82) B.M.J. ii, 1868:259.

(83) Med. Times & Gaz. ii, 1868:276.

(84) 1868c. (1888:V,114.) See note 57.

(85) This point is discussed in the next Chapter.

(86) 1864a. (1888:V,67.)

(87) It was not lost completely from the terminology of speech disorders. Some 19th century British clinicians used it in Broca's sense (see Chapter 4). Since then, both it and its sister-term 'dysphemia' have been used as a synonym for 'stuttering'. (See, for example, Luchsinger & Arnold 1965:739 et seq.)

(88) Broca 1869. (1888:V,122.)

(89) See above, page 232.

Additional Note

After this Chapter was written, Dingwall's résumé of some of the papers given at the Broca Centennial Conference in 1980 was published (Dingwall 1981). It has, therefore, not been possible to incorporate a discussion of his résumé into the body of the Chapter. However, the following two points of disagreement with Dingwall are pertinent. Firstly, on the basis of the contents of Broca's papers

Additional Note (Contd.)

on neurolinguistics, there is no justification for saying that 'Broca was led to the discovery ... [of] the precise localization of the faculty of articulate language speech in the brain' (p.199), especially since Dingwall uses 'articulate language' in the sense of 'speech' in general (p.202). Secondly, Broca nowhere spelt out precisely what he meant by the term 'le langage' - see the clear discrepancy between 'le langage régulier' and 'le langage' in Figure 7, p.167. Hence I cannot agree with Dingwall's view that Broca's 'conception of language ... involv[ed] an amalgam of faculties of general intelligence, of language per se (a faculty which serves to establish a constant relation between ideas and signs), of articulate language, etc .....' (p.202).

CHAPTER 4

NEUROLINGUISTIC STUDIES, 1864 - 1894

NOTES FOR CHAPTER 4 ARE BETWEEN

PAGES 395 AND 424

4.1 General

The 1860s marked a turning-point, not only for the study of aphasia, but for other branches of medicine and science too.(1) In 1859, the year that saw the publication of Darwin's Origin of Species, the National Hospital for the Paralysed and Epileptic was opened in London. The following year, 1860, another important landmark in the development of medicine was the opening of the Children's Hospital in Edinburgh. And in the same year, Florence Nightingale established her School for Nurses at St. Thomas's Hospital in London. The middle years of the decade were noticeable for Lister's work on antisepsis (1865-1867), and, on the Continent, for Mendel's on heredity (1866) and Helmholtz's on optics (1866). The renewed and invigorated study of aphasia was but another example of how medical and scientific studies developed in a different direction from that which had been typical during at least the first half of the century. It was in this changing pattern of medical research and medical care that a paper by Hughlings Jackson, describing his findings in seven cases of 'loss of speech', was published in January 1864.(2) It was to set out questions that needed years of research to answer: such as the nature of 'talking'; the analysis and differential diagnosis of cases of aphasia in which an articulatory disorder was 'superadded' (to use Jackson's own word) on the lexical and grammatical disturbances; and the relationship of aphasia to right-sided, not left-sided, hemiplegia.

4.2 The 'aphasiologists'

4.2.1 Famous names

The break with the earlier period of research into "aphasia" was almost total, not only in terms of the particular orientation that the study of the subject entailed, but also, more mundanely, in the personnel who interested themselves in the subject. Many of the authors of case-studies and discussions from the pre-1864 years lived on well into this second period, but only four of them, Robert Dunn, John Ogle, W.A.F. Browne and James Copland kept up their interest in the subject, as evidenced in the published literature; the remainder, people like James Bennett, Thomas Shapter and William Steele simply took no further part in the research. In addition, many of the major figures from the earlier period had died, including Abercrombie, Bell, Bright, Cheyne, Crichton, Hall, Osborne and Stanley. Perhaps most poignant of all was the death of Jonathan Osborne, who, in his famous paper of 1834, had pointed the way forward for the study of aphasia: he died just eight days before the publication of Hughlings Jackson's first paper on aphasia, the work that marked the beginning of the new period.(3)

The new students of neurolinguistics were generally younger than their counterparts in the first half or so of the 19th century; indeed, on the basis of age, some of them fall into two groups: those born around 1824 and those born around the mid 1830s.(4)

The impression has been given, for example by Head,(5) that only a small handful of clinicians interested themselves in the subject (although between them they created a sizeable literature): people like

Hughlings Jackson, Bastian, Ferrier and Broadbent. This is not so. More than 220 clinicians from almost all parts of the British Isles contributed something to the literature. For some, it was simply a single case-report,[6] but for others, at the opposite extreme, aphasia represented one of their major clinical and research interests.[7] Some of the contributors, either on account of their work in clinical neurology or for other reasons, were eminent members of the Victorian medical profession, and were later commemmorated in the DNB.

4.2.2 Reasons for interest

It may perhaps seem idle to speculate on why certain clinicians took such a profound interest in the subject of aphasia; there are no extant 'confessions of faith', and it might appear, then, that one must attribute it all to an interest in 'language' (as well as, of course, to a professional interest in neurological matters). But it could be that two particular factors were at work. One was that a number of those clinicians who contributed more to the subject than a brief case-report - people like Jackson, Ferrier, Broadbent and Ross - had a good command of French, and this in itself would have allowed them to read the extensive discussions of aphasia in the French medical journals and press.[9] They may even have felt drawn towards the subject of aphasia because they first read about it in the French press. Broadbent, for example, was noted for his 'remarkable proficiency' in the language,[10] and Bateman was regarded as 'an accomplished scholar in both modern and classical languages'![11] two of his papers on aphasia were actually written in French.[12] Perhaps also, in this connection, John Popham's background in classics - he had been a Berkeley Medallist in Greek at Trinity College, Dublin[13] - may have directed his attention towards matters of language in the field of medicine.

The second factor is an interest in philosophy. David Ferrier had taken a First in Classics and Philosophy at Aberdeen in 1863 before going on to study psychology and medicine.(14) Hughlings Jackson had at one time been on the point of giving up medicine altogether and devoting himself to philosophy instead - this was before he became seriously aware of the phenomenon of aphasia.(15) And James Ross had been a person for whom questions of 'philosophy and metaphysics had had special charms'.(16) Bastian, too, although not professing any decided interest in philosophy, had nevertheless studied the subject as part of his first degree (in Arts) at London.(17) It was probably a natural interest in questions of metaphysics, of the philosophy of mind, that predisposed these clinicians to see in aphasic phenomena the opportunity to examine in fairly abstract terms the way in which the mind may operate.

4.3 Growth of the literature on aphasia

4.3.1 General

The study of aphasia, as evidenced by the published case-reports and discussions, gathered pace relatively slowly at first: by May 1864 Jackson had described, in general terms, his findings in a number of aphasic patients. Then over the summer and into the autumn and winter of 1864 the pace began to quicken. 1865 was marked by the publication of twelve items on aphasia, by different authors. 1866, however, was the year in which a number of particularly notable contributions were forthcoming: there were case-reports and some well-formulated general accounts of aphasia by clinicians such as Sanders, Banks and Gairdner. Altogether that year, a total of 37 items appeared in print. The pace slackened considerably in 1867, but reverted to the 1866 pattern the following year.

An examination of the chronological listing of the various reports and studies (Appendix A) reveals not only the considerable effort that was devoted to trying to unravel the problems of aphasia, but also the way in which the same high level of interest was maintained, with few exceptions, year after year. Hardly a month - in some cases, a week - passed without a case-report or a new suggestion about the nature of aphasia or about a clinical sub-type being discussed in print.(18) It was only in 1889, twenty-five years after Jackson's first paper on the subject, that the level of interest, as shown in the number of works published that year, appeared to falter; but it soon picked up again.

4.3.2 Medical societies and conferences

A further characteristic of the study of aphasia during these thirty years from 1864 to 1894 was the way in which it was selected as a topic for discussion (out of the numerous medical topics that were claiming the attention of the medical profession as a whole during this period) at meetings of many medical and non-medical societies in England, Scotland and Ireland.(19) At eight of the annual meetings of the British Medical Association between 1867 and 1892 the subject of aphasia was discussed,(20) and also at certain branch meetings of the BMA, especially in the second half of the 1880s.(21) But the majority of cases that were first presented and discussed at meetings of societies were at meetings of societies independent of the BMA: in Birmingham, Brighton, Canterbury, Cork, Dublin, Edinburgh, Glasgow, Liverpool, London, Manchester and Norwich.(22) In addition, reports were carried in the British medical press of discussions of aphasia at meetings of various foreign medical societies, in France and the United States.(23)

Taking meetings of the various BMA and non-BMA societies as a whole, one can say that in 1865 and 1866 the areas of the British Isles in which aphasia was particularly discussed at meetings were Scotland and Ireland. Between 1867 and 1874, the centre of attention moved to England, and in particular to London. Between 1883 and 1893, England was again the country in which aphasia was most frequently discussed at meetings of medical societies, with certain Midland and Northern English cities (Birmingham, Leeds, Liverpool and Manchester) acting almost as a focus of interest for the subject.

The content of these presentations (some of which were subsequently published) varied from demonstrations of aphasic patients, demonstrations and discussions of the brains of aphasics, discussion of particular case-histories, and even attempts to summarize the state of knowledge of the subject. One of the most outstanding of the latter type was the paper Gairdner read in March 1866 to the Philosophical Society of Glasgow.(24) Another famous meeting was that of the BMA at Norwich in 1868, at which Bateman, Broca and Jackson (amongst others) joined in what, from the reports, appears to have been a series of heated arguments on many aspects of aphasia. Less contentious were three meetings of the Medical Society of London in the winter of 1868-1869 at which Bateman, Day and Maudsley delivered some blistering comments on Broca's hypothesis of where 'language' was localized in the brain. We should note, furthermore, that various lecture series provided the opportunity for topics within the field of aphasiology to be introduced to a wide medical audience: the Gulstonian lectures by David Ferrier,(24a) the Lumleian lectures by Bristowe,(25) and the Croonian lectures by David Ferrier.(26)

4.3.3 Books on aphasia

It was during this period too that a number of books on the subject of aphasia began to appear. The first was Bateman's On Aphasia (1870), a reprint of a series of journal articles. This was followed, in 1878, by the English translation of Kussmaul's Die Störungen der Sprache (1877), which, unlike Bateman's work, had the advantage of setting the phenomenon of aphasia within the wider perspective of speech disorders in general.(27) Ross's Aphasia (1887) was a reprint (with some small additions) of a series of journal articles;(28) similarly, Wyllie's Disorders of Speech (1894), which was essentially the text of articles that had begun appearing in 1891.(29)

4.3.4 Aphasia in the medical encyclopaedias

A further development, compared with the pre-1864 period, was that sections of general medical textbooks were given over to the subject of aphasia: in itself an indication of the supposed state of maturity that had been achieved in the understanding of the subject, as well as perhaps of the demand that existed amongst clinicians for succinct and readable summaries of the medical, linguistic and psychological backgrounds to the condition. In this connection, one notes the works of Bristowe (1876), Wilks & Moxon (1875 etc), Ross (1881b), and Gowers (1888; 1893).

Yet another indication of how aphasia was attracting the attention of the medical profession was the seven editorials on the subject in both the BMJ and the Lancet, between 1866 and 1885.(30)

A feature of this period, especially in the first few years, was the range of opinions that the subject elicited. Thus, on the question of Broca's hypothesis of 'language' localization, Bateman was adamantly against Broca's view; Broadbent, on the other hand, was passionately in favour of it, and prepared to find perfectly rational explanations for all the counter-examples to Broca's hypothesis. In the middle, as it were, stood Hughlings Jackson, able to see beyond the specific question of localization to the much wider issues posed by aphasia.(31)

4.4 The 'aphasics'

4.4.1 Number of cases

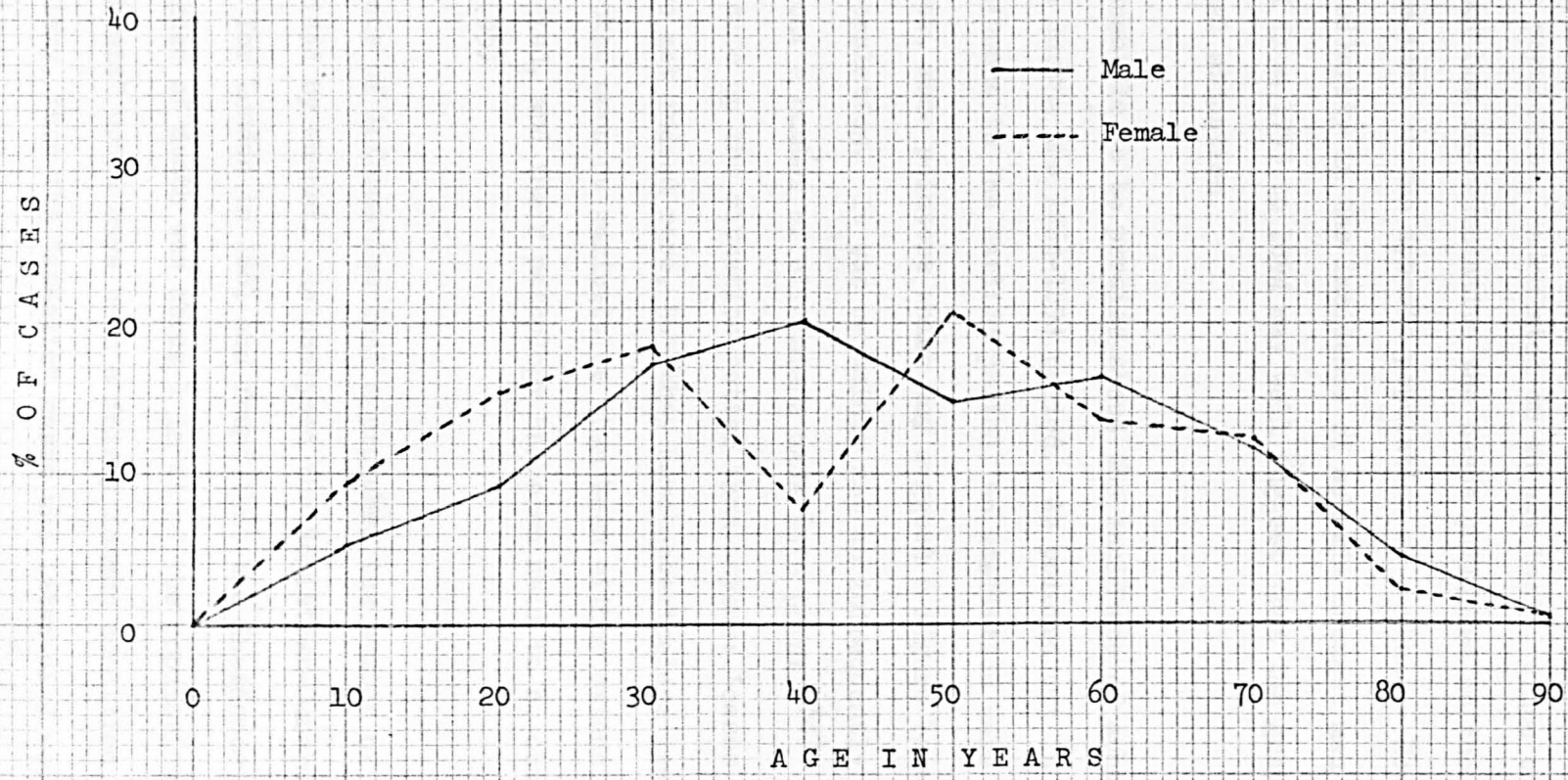
The total number of cases of "aphasia" in the British literature between 1864 and 1894 was 1218. Of these, 742 (60.9%) were cases in which the age and sex of the person was not stated. The remainder were divided almost exactly in a proportion 2:1 of males to females (317 males; 158 females). In 255 of the male cases and in 131 of the female cases the age is specified.

Figure 9 sets out the occurrence of aphasia in the case-reports on an age and sex basis. The same statistical analysis has been performed as for the earlier period: the number of cases aggregated over a ten-year age-range has been expressed as a percentage of the total number of cases. Thus, in the 21-30 year old male group there are 44 cases: this is 17.254% of the total number of male cases in which the age is specified (255 cases).(32) From the graph (Figure 9) it will be seen that the incidence of aphasia was highest for men aged between 30 and 60, whereas for women the critical year (or rather the ten-year range preceding it expressed as the upper age) was 50.

Figure 9

INCIDENCE OF "APHASIA" ACCORDING TO AGE

IN THE CASE-REPORTS 1864-1894



A comparison with the graph for the period 1793-1862[33] shows a similar pattern of distribution according to the age of the men, but a later peak for women in the 1864-1894 period. It should be emphasized that the graph cannot be taken as an accurate reflection of the incidence of aphasia in the population, calculated on an age basis, since one knows nothing about how representative the cases published in the medical literature were of the aphasic population as a whole. However, the remarkable similarity in the incidence of aphasia amongst men over the entire period from 1793 to 1894 may well suggest that the graph reflects the actual situation.

It is not possible to be precise about the incidence of aphasia in the population during the 1864-1894 period. As pointed out in the discussion of incidence in the earlier period, no statistics were kept. There were, however, some pointers which may suggest a figure between 1 and 2% of the population. It was certainly not an infrequently occurring condition: a number of clinicians made this point.[34] Sanders probably sums up the situation better than anyone: 'cases of loss of speech are not indeed rare, but they have nevertheless been usually rather looked upon as curiosities than been either extensively or accurately studied, and their pathology has been held to be obscure and inscrutable'.[35]

The only piece of information that approaches the status of a statistic is provided by Mushet. He analysed the Registrar-General's Mortality Returns for London in 1861 and found that the incidence of apoplexy as the cause of death was about 1 in 44 of the population.[36] Assuming that "aphasia" would have been a fairly common condition accompanying apoplexy, then the "aphasic" cases who later died would

have constituted something less than 2% of the population. Making allowances for the cases of aphasia which did not result in death, a reasonable assumption about the incidence of the condition must be that at any one time it existed in about 1 to 2% of the population.

4.4.2 Geographical provenance of cases

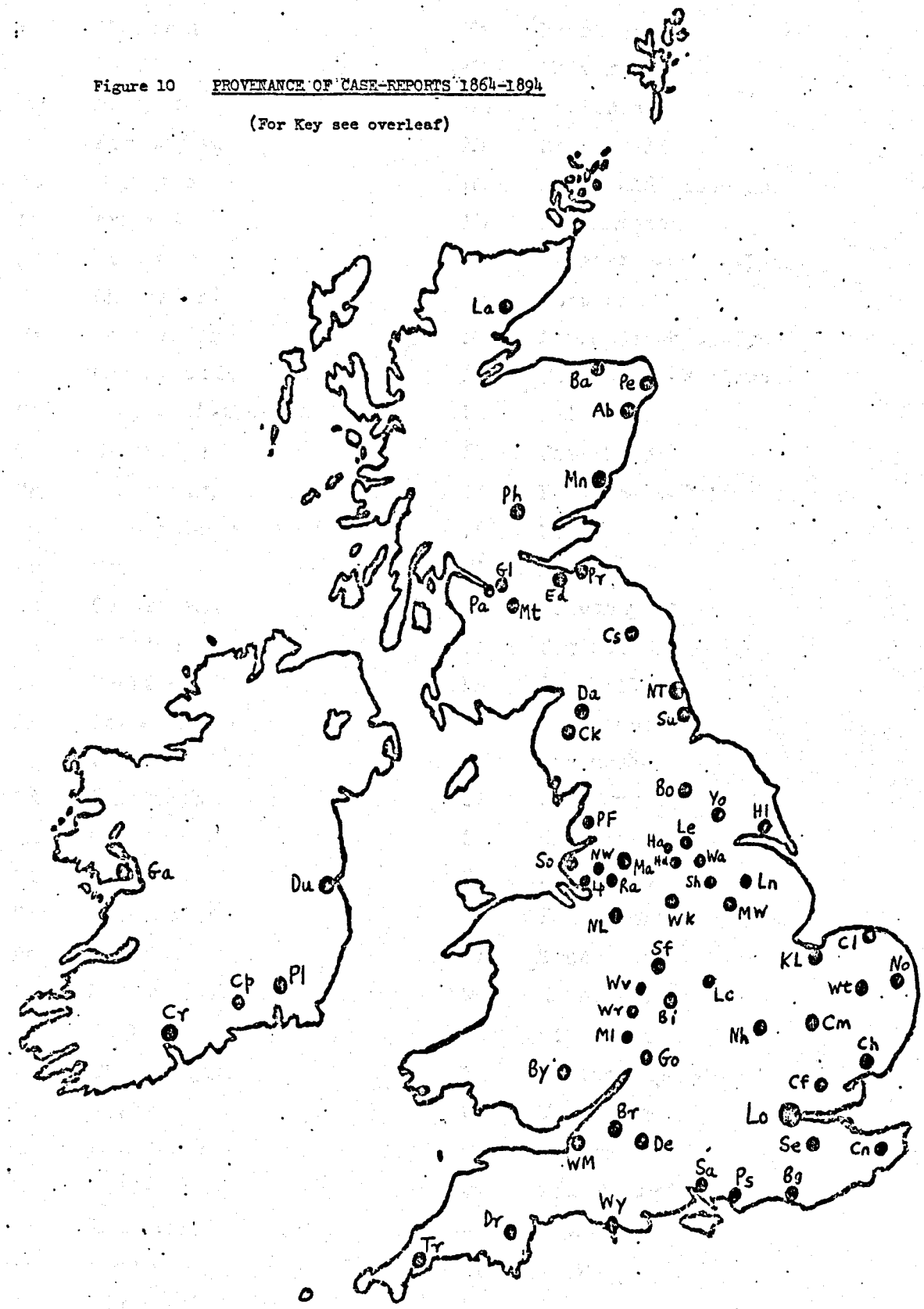
The case-reports themselves originated from both private practices and hospital wards in urban and rural areas across a wide section of the British Isles. To indicate the geographical spread of the case-reports, a map with the provenances of the reports is given as Figure 10.(37) Almost all of the patients were monolingual: there were occasional reports which touched on Welsh and German (as spoken by residents in the British Isles); there were no studies, however, of Scots Gaelic or Irish Gaelic speaking aphasics.(38)

4.4.3 Social background

Details of the social backgrounds of the patients are not always given (in many cases, they are irrelevant to the interpretation of the case). In fact, they are given in only about 7½% of all the cases. If one takes into account only those cases for which the age and/or sex of the patient is detailed and excludes from consideration any children under the age of 14, then in only about 20% of cases is anything said about the patients' social backgrounds. However, bearing these restrictions on the interpretation of the cases in mind, it does seem as though aphasia was not a condition which affected only one section of society. As in the period 1793-1862, there are sufficient examples of aphasia occurring in all of the socio-economic groups for one to be able to conclude that it was not specifically a 'working-class

Figure 10 PROVENANCE OF CASE-REPORTS 1864-1894

(For Key see overleaf)



KEY

Ab	Aberdeen	Ma	Manchester
Ba	Banff	Ml	Malvern
Bg	Brighton	Mn	Montrose
Bi	Birmingham	Mt	Motherwell
Bo	Brompton	MW	Mansfield Woodhouse
Br	Bristol	Nh	Northampton
By	Brynmawr	NL	Newcastle-under-Lyme
Cf	Chelmsford	No	Norwich
Ch	Colchester	NT	Newcastle-upon-Tyne
Ck	Cockermouth	NW	Newtown-le-Willows
Cl	Cley-next-the-Sea	Pa	Paisley
Cm	Cambridge	Pe	Peterhead
Cn	Canterbury	PF	Poulton-le-Fylde
Cp	Cappoquin	Ph	Perth
Cr	Cork	Pl	Portlaw
Cs	Coldstream	Pr	Prestonpans
Da	Dalston	Ps	Portsmouth
De	Devizes	Ra	Rainhill
Dr	Dartmoor	Sa	Southampton
Du	Dublin	Se	Sevenoaks
Ed	Edinburgh	Sf	Stafford
Ga	Galway	Sh	Sheffield
Gl	Glasgow	So	Southport
Go	Gloucester	Su	Sunderland
Ha	Halifax	Tr	Truro
Hd	Huddersfield	Wa	Wakefield
Hl	Hull	Wk	Wirksworth
KL	King's Lynn	WM	Weston-super-Mare
La	Lairg	Wr	Worcester
Lc	Leicester	Wt	Watton
Le	Leeds	Wv	Wolverhampton
In	Lincoln	Wy	Weymouth
Lo	London	Yo	York
Lp	Liverpool		

or a 'middle-class' phenomenon. Admittedly, there are a fairly high proportion of working class occupations and backgrounds amongst the cases, but this could simply reflect the structure, in numerical terms, of British society during this period; alternatively, it could be due to the fact that the families of middle- and upper-class aphasics may have been unwilling to allow an autopsy of the head to be performed, and hence potentially valuable information in the form of a case-report would be excluded. Also, if other conditions were present in the aphasic, e.g. syphilis, these too might militate against the possibility of a more representative cross-section of aphasics being discussed in print. Nevertheless, on the basis of the published literature, it did seem that aphasics came from a very broad spectrum of society, such as the Army, the Church, education, medicine, the business world, carpentry, bricklaying and plumbing.(39)

Some occupations might seem to have been more aphasia-prone than others: for example, quarrying and trapeze dancing. But with others (for example, hat-shaping) there could hardly have been, by virtue of the nature of the work involved, any natural predisposition towards aphasia.

Of the traumatic cases, perhaps the most unusual (and certainly the luckiest) was that of a blacksmith who was struck on the head not by an implement from his workshop but by a 9lb brick falling 80' from a chimney-stack. He became aphasic and hemiplegic (but only for a day) and then made a complete recovery.(40)

4.4.4 Ages of aphasics

It will be seen from Figure 9 that aphasia was found across virtually the entire age-range.

4.4.5 Causes of "aphasia"

The information contained in the case-reports for 1793-1862 showed that a variety of factors were held, rightly or wrongly, to have been responsible for the "aphasia". In the case-reports from 1864 onwards, one finds almost all of the same causes as before, but there are four new ones: syphilis, the use of particular medicaments, poisoning, and the effect of certain climatic conditions. The last three are dealt with separately below.(41)

4.4.5.1 Use of particular medicaments

John Ogle reported that one of his patients, as a result of taking opium for medicinal reasons, began to 'talk foolishly', to call 'things by their wrong names'.(42) Two other cases, one the consequence of smoking stramonium, the other that of smoking cannabis, also produced "aphasic" effects, although the results were not identical. Nicholls described how one of his patients had smoked stramonium to relieve the symptoms of asthma, and 'After several pipes [he] would begin to call things by wrong names, and this without knowing'.(43) After a sound sleep, the patient made a complete recovery and could recall nothing of the "aphasic" episode. A second case involved a person who, to relieve severe headache following a stroke, was compelled to take large doses of cannabis indica, and as a result 'in talking he misnamed almost everything and called his head his foot, etc., etc.'.(44) However, unlike the other patient, he was well aware

of what was happening to his speech. A curious feature of this second case is that Nicholls does not countenance the possibility of the stroke having caused the "aphasia", with the cannabis merely highlighting some of its characteristics. He implies that it was the cannabis alone that led to the "aphasia".(45)

4.4.5.2 Poisoning

It was pointed out by William Ogle that "aphasia" resulting from snake bites was 'not an excessively rare [occurrence]' and that six previously reported examples of it could be found in the medical literature.(46) The explanation of the "aphasia" was that the poison had passed through the middle cerebral arteries and produced cerebral spasms.(47) A further case of poisoning was that of a young boy who had been poisoned by oenanthe crocata, which led to his 'utterance [being] totally abolished, and but slowly returned'.(48) This was explained not in terms of a true aphasia, but of a paralysis of the muscles of the tongue: it was likened to the condition described by Romberg as 'glossoplegia articulata'. Lastly, cases of "aphasia" produced by uraemic poisoning were discussed on two occasions.(49)

4.4.5.3 Climatic conditions

The effect that a particular type of climate could have on a person's constitution such that "aphasia" might result was exemplified and discussed at length by Fayrer in two cases from India.(50) The first concerned an otherwise perfectly healthy man, living and working in India, who suddenly developed a right-sided hemiplegia, with 'indistinct articulation of certain words' and an 'unnatural rapidity of utterance'. As the hot weather came on, his condition deteriorated:

his memory became 'defective', his 'speech more rapid and uncertain' and his intellectual powers began to fail, until finally he was a classic case of aphasia and dysgraphia. The extensive softening of the brain found at post-mortem could not be attributed initially to the weather, but Fayrer concluded that the climate played a role in accentuating the condition.(51) The second case was described as a case of transient aphasia, in which the patient talked 'incoherently ... [and] lost the memory of words'. Fayrer attributed it to a disturbance of circulation and to the 'hot, damp, and malarious Indian climate'.(52)

4.5 Some characteristic features of aphasiology

4.5.1 'A subject of great curiosity and interest'

Until the mid 1860s, the subject of "aphasia" had continued to be regarded by the medical profession in the British Isles, judging from the comments on it in the pre-1864 literature, as one which aroused a certain degree of interest. Thus Henry Holland, for example, could say in 1852 that the clinical category of memory disorders (and this included "aphasia") constituted 'some of the most curious phenomena which come under the notice of the physician';(53) in itself, however, "aphasia" was not seen, in general, as a topic which was likely to cause difficulties either of analysis or elucidation.

A similar sentiment runs through the work of a number of clinicians, even after some of the major problems inherent in the study of the subject had become all too apparent from the mid 1860s onwards. Sanders described aphasia as a subject of 'great curiosity and interest ... in relation to metaphysics and the philosophy of mind';(54)

Moxon and Bateman remarked, almost too matter-of-factly given the degree of understanding of the subject by 1867, on the way in which it was catching the interest of many clinicians.(55) In 1869, Bateman even went so far as to claim, calmly and somewhat loftily, that 'the faculty of articulate language' was 'one of the highest human attributes'and that there was 'no subject more worthy of the attention of the philosophical physician than the investigation into the causes which interfere with the proper use of this faculty'.(56)

At the level of clinical realities, however, where physicians grappled not so much with describing the symptoms and the post-mortem evidence of the aphasia as with trying to explain the discrepancies between the projected and actual findings, the subject gradually began to be viewed in a very different light. Broca himself had said, in 1861, that the subject was 'assez obscur et assez compliqué',(57) and once British clinicians, some four years later, started to actively engage in discussing the same sorts of data, they soon found themselves agreeing with him. Over the next thirty years or so, the same battery of words was to be used to describe the subject: it was 'baffling', 'complex', 'complicated', 'conflicting', 'confused', 'difficult', 'intricate', 'mysterious', 'obscure' and 'tangled'.(58) And by 1868, the Lancet was to remark, in an editorial, that the previous six years of study (as much on the Continent as in the British Isles) had been 'six weary years' during which 'the battle [had] raged', that 'there [had] seldom been, in the history of medical polemics, a more singularly tangled controversy'.(59) A month later, Bateman was to write that so much had been written on aphasia, yet 'so little [was]

really known' about it.(60) Clearly, Head's description of the years of 'chaos' in aphasiology (from 1900 to 1920) could have been applied just as effectively to the second half of the 1860s.

4.5.2 Reasons for the confusion

What was the reason for this state of affairs - one that was to continue for many years afterwards? The Medical Times & Gazette pointed out that the terminology that had grown up around the subject of aphasia was of itself a decided drawback for researchers: 'the inventive profusion of [the nomenclature] borders on the ludicrous'.(61) Similarly, Broadbent was to remark that 'Even words like aphasia and amnesia, brought into use for the express purpose of defining a single invariable condition' had become instead 'snares and hindrances by being employed to designate by the same name affections which a careful description would have shown to be different'.(62) The Glasgow Medical Journal, on the other hand, offered no explanations. It simply dismissed much of the literature as being 'a weary waste of words'.(63)

Yet was it simply the terminology that was to blame or was it that a whole series of studies had failed to uncover the key to aphasia? Perhaps, with the hindsight that our present position, some 120 years after aphasiology really came into being, has given us, we can see that other, less tangible, reasons lay behind the state of the subject in the thirty years between 1864 and 1894.

At least two clinicians thought that they had pinpointed the basic problem or problems. After just a few months of working with aphasics, Hughlings Jackson could say that 'In a subject so wide and vague as Language, it would be a simple work to pile up ingeneous

theories, but to find a method to arrange the varying facts in many actual cases, is quite a different thing'.(64) Over twenty years later, William Gowers attributed the state of the subject to three factors: its inherent 'complexity', a 'deficiency of facts' and 'a redundance of theory'.(65)

One purpose of the present Chapter is to explicate and justify the three reasons Gowers put forward and to show at the same time the correctness of Jackson's general comment. The 'facts' Gowers mentions can be interpreted as being neurological and linguistic, the 'theory' a neuropsycholinguistic one. It is, therefore, necessary to consider the extent to which aphasic speech was subjected to one or more types of linguistic analysis, and, secondly, later on, to examine what might be called the neuropsycholinguistic models of language processing that were set up and/or used by some clinicians in order to try to find an explanation for their patients' aberrant forms of language. In general, however, it will be seen that at the root of the difficulties faced by aphasiologists was the absence of any reasonably well formulated and generally accepted framework within which to describe and explain aphasic phenomena.

4.6 Linguistic frameworks for the study of aphasia

4.6.1 Linguistic terminology: the beginnings of a neurolinguistic theory?

In the years up until 1862, the nature of "aphasia" was occasionally described and discussed against a background of ideas from either linguistics and/or psychology.(66) In the years following 1864 this tradition was continued.(67) Through the journal articles were

scattered such phrases as 'expression', 'language', the 'general faculty of language', 'articulate language', 'the faculty of articulate language' and 'intellectual language'. The use of such terminology would suggest,then, that neurolinguistic research was being conducted on the basis of an established series of theoretical principles. This appearance, however, is deceptive. Indeed, it is noticeable that a number of clinicians were aware of the dangers inherent in accepting such terms at their face value. Thus, the BMJ pointed out, in an editorial in September 1866, that there was 'enough confusion about such words as 'memory', 'thought', 'language', 'speech'.(68) Perhaps it was articulating a sense of unease that by then had developed in neurolinguistic work. A few months later, Hughlings Jackson was to emphasize that too much importance had been attached to the term 'faculty of language' in discussions of aphasia, and that it should either be dispensed with altogether, or its true status clarified.(69) For the same reason, John Ogle refused to use it, and replaced it with what to him - if to no one else - seemed a more meaningful expression, 'the power of using articulate language'.(70) Whether, indeed, it was more meaningful or even whether it had the same implications as 'faculty of language' is debatable. In essence, then, at least some clinicians were aware of the relatively weak foundations on which the study of aphasia was being pursued.

4.6.2 The nature of 'language'

Equally perceptive were other criticisms of the way in which the study of aphasia was progressing without the principles of the investigation being established beforehand. Popham, for example, said that the problem in aphasia studies was that 'the study of language as a

science' had been neglected,(71) and the Lancet stated, in 1868, that language had to be seen as a 'very much more complicated faculty than had been assumed'.(72) But it was an insight by Maudsley that was to highlight the theoretical shallowness of much of the work that was being done: he wondered if Broca and his fellow clinicians 'understand clearly, what they mean by the faculty of speech'.(73)

What were the alternatives to the use of such expressions as 'faculty of language'? Both Russell and Maudsley pointed out that 'speech' had to be conceived of as consisting of two separate parts, or 'essential factors' as they called them, before any enquiry could be made into the nature of aphasia. These were the 'intellectual' and the 'mechanical' elements of speech'. For Russell, the 'intellectual side of language had to do with 'the faculty of remembering the words ... and associating them with the ideas';(74) for Maudsley, one aspect of language was the 'idea', the other was the 'motor act'.(75) Hughlings Jackson drew a different distinction between two sorts of language: 'intellectual' and 'emotional', and it was this as well as the distinction between 'intellectual' and 'mechanical' that he considered to be the critical one for an understanding of the nature of aphasia.(76)

Various other suggestions circulated as to what it was that should be focused upon in aphasia. Hunt thought that it was the thinking process: 'Language [used] in its widest sense, almost synonymous with expression, is ... only another word for thought'.(77) Keith Anderson, on the other hand, was more specific, and, unlike Hunt, was obviously concerned to work with concepts that would have

practical clinical validity. Thus, for him, language was the 'establishment of a definite relation between an idea and a sign by which that idea is manifested';(78) the 'general faculty of language' was 'all the different modes of expressing thought' - undoubtedly an attempt to interpret Broca's 'faculté générale du langage' - and 'human speech', or its synonym 'articulate language', was the 'voluntary production of a series of articulate sounds associated with words'. Despite these attempts to clarify some of the premises on which the study of aphasia was being based, one suspects that Maudsley's comment that a word was 'nothing more than the artificial mark of the muscular activity of speech' (79) or, equally, Gairdner's somewhat cryptic statement that 'names and nouns' were 'the aboriginal nuclei of articulate speech'(80) might well have created more uncertainty than enlightenment in the minds of clinicians as to what it was in aphasia that had been disturbed and therefore should be investigated.

All the above mentioned views on language and its constituent parts were expressed in the space of two years up to 1868, but they did not lead to any major re-consideration of the nature of either language or aphasia within clinical circles. In the following years, the subject was broached again, but the effect on the great majority of clinicians, working with aphasics, appears to have been minimal. One had a situation, then, in which attempts were being made to define (and where necessary re-define) the very principles which should govern the form of the investigation of aphasia; yet the bulk of clinicians either agreed tacitly with the views of colleagues like Hughlings Jackson, John Ogle, Maudsley, and so on, but, for whatever reason,

were unable to put their ideas into practice, or else failed to appreciate the grounds on which such views had been put forward in the first place.

It is worth considering what other attempts were made in the medical literature after 1868 to draw attention to the underlying weakness of the framework that was being proposed for the understanding of aphasia. In 1872, Wilks was saying that 'Writers on language have not sufficiently asked themselves what they have meant by this term, and therefore have often failed to discern how complex a faculty it is'.(81) What he envisaged was that the concept of language should be discussed in psycho-physical terms, not, as linguists were doing, in terms solely of 'words', 'syllables', 'sounds' etc, and thereby leaving the major features of the psycho-physical dimension to be taken for granted. In his opinion, the 'faculty of language' embraced the analysis of the incoming data from the eye (for reading) and from the ear (for hearing and speech-comprehension) in the 'perceptive centres', as well as the entire process whereby the brain organises and passes information to the 'vocal organs'.(82) A comparison of his view of the nature of the 'faculty of language' with that of other clinicians involved in the study of aphasia, shows the potential ambiguity the term held for clinicians who looked to people like Wilks for clarification and elaboration of the concept. Thus, elsewhere in the case-reports of aphasia, language was defined as 'the faculty possessed by mankind of giving expression to the thoughts either by word of mouth, gesture or writing',(83) or, less specifically still, as 'the various means by which animals communicate'.(84)

A narrower definition was that language 'consists of sounds, which are the signs of our ideas'.(85) Between these two extremes, one nevertheless perceives an area of general agreement: that language had to be considered from two points of view, as an intellectual phenomenon and, secondly, as a psycho-physical act.(86)

However, no specific agreement existed as to the precise characterisation of the second aspect, the psycho-physical act. Tuke and Fraser took it in the sense of the 'faculty which presides over the co-ordination of the movements by which words are produced', that is, in the sense of Broca's 'faculté du langage articulé'.(87) Kussmaul, on the other hand, simply interpreted it as 'the physico-psychical act of expression by thought'.(88) Suckling was even less specific: 'an objective or motor aspect'.(89)

An inevitable conclusion from the above, therefore, must be that one of the very principles on which aphasia research had to be conducted, namely the definition of the term 'language' had, even by the late 1880s, still not been properly clarified. Furthermore, although the term 'language' was used by the majority of linguists and psychologists to refer to the total psycho-physical process of giving utterance to thought,(90) there was no discussion - at least in the literature dealing specifically with aphasia - of the nature of the psychological (as distinct from the physical) aspects of the process. For this reason, then, the comments by clinicians such as Broadbent (see below) and others on the character of the mental processes involved in speech production, may be viewed as breaking new ground in the formulation of a theory of language.

Uncertainty about what was meant by the word 'language' would have implied a similar degree of uncertainty about the nature of aphasia. It was Bastian who was to put his finger on the cause of the fairly extensive amount of disagreement amongst clinicians as to what aphasia involved, when he said that unless the very nature of a 'word' was understood, then the concept of aphasia itself would, by definition, also be suspect. The mistake, be believed, was to imagine that a word was laid down in the brain as single element. In his view, 'our memory for words is not simple and single, but is in reality fourfold'.(91) His general premise that a defect in the psycholinguistic characterisation of the nature of language would lead inevitably to an equal misapprehension of the nature of aphasia, was echoed, albeit implicitly, by the reviewer of Bateman's On Aphasia (1890). The key to an understanding of aphasia lay in how the term 'faculty of language' was interpreted: Bateman was accused of treating this 'intricate subject' 'so scantily'.(92) Rosse, nevertheless, believed that 'a study of the normal laws of language should precede the inductions of anatomy and pathology'.(93) What exactly he had in mind, however, by this remark is uncertain, since he went on to say that such a study should be carried out 'without going out of the domain of medicine'.

4.6.3 What is a 'word'?

Much of the discussion of the dualism of language, its intellectual and its mechanical features, focused on the nature of words. The views of, in particular, Broadbent, Hughlings Jackson and Bastian were of especial relevance.

Broadbent envisaged words being 'motor processes' as well as either 'intellectual agents' or 'intellectual symbols'; the latter 'probably represented in the auditory perceptive centre by receptive or recipio-motor cell-groups'.(94) Of these, it was nouns that were singled out for special attention. Names (i.e. nouns) are the 'intellectual symbols'; all other parts of speech are the 'intellectual agents'. Nouns have this status because 'they are ... associated with [and] tied down by visual, tactual, and other perceptions'; the other parts of speech merely 'constitute the framework of a sentence or proposition'.(95) This emphasis on nouns as the most critical aspect of language returns again, but more stylishly expressed, in a later work in which he says that 'Nouns ... represent the final act of intellectual elaboration of the perceptions derived from the different senses'.(96) Support for Broadbent's view came from Ladd, who established a hierarchy of loss amongst the parts of speech in aphasia: 'proper names, substantives generally, verbs, adjectives, pronouns ...'.(97)

The exceptional potential of Broadbent's view for a theory of language structure, quite apart from its value as a theory for the analysis of aphasic language, was, never unfortunately, developed further by him, or by any other researchers.(98)

A different point of view on the nature of words was expressed some years later by Starr, who, following Charcot, described a word as being 'a complexus [of] four distinct elements': auditory, visual, motor articulatory and motor graphic memories.(99) (Bastian's views, which coincided closely with, and were doubtless part of the source of Starr's are discussed below.(100) Jackson's views are dealt with in Chapter 5.(101))

From the above summaries, it is clear that there was no unanimity amongst clinicians about the nature of words; secondly, that none of their ideas appeared to derive from anything that the linguists and psychologists of the period had discussed.(102) Indeed, it was the attempt to provide a physiological definition of the word rather than a purely psychological and linguistic one that distinguishes, in one respect, the clinicians from their colleagues in the two other disciplines.

4.6.4 Use of grammatical terminology

In Chapter 2 we noted the emergence of a 'linguistic' approach to the description of speech disorders, with the use, albeit fairly infrequently, of concepts and terminology from traditional grammar and from phonetics. This tradition is continued in the work from 1864 onwards.

One comes across occasional references to 'broken sentences',(103) to the inability of the aphasic patient to complete a sentence after he has uttered the first word or two,(104) and to the inability to arrange words in the expected order within sentences.(105) The possibility of a supra-sentential disorder is suggested, in one case, by Russell: the patient was unable to 'arrange sentences' (in speech, that is).(106)

Taking the period 1864-1894 as a whole, it is remarkable that so very few clinicians attempted even to avail themselves of traditional grammatical terminology with which to describe their patients' speech-patterns. Rather than describe, they opted instead to find a suitable clinical term with which to sum up their patient's condition, such as

'amnesic aphasia'. Jackson's exhortation to put down on paper what the patient could do and to avoid such words as 'verbal amnesia', was scarcely heeded.(107)

4.6.5 Use of phonetic terminology

4.6.5.1 Specific examples

Compared with the highly limited use of grammatical concepts, a major feature of the 1864-1894 period, at least until the end of the 1870s, was the wider use of phonetic principles and terminology. Thus, from 1864 onwards, one finds descriptions such as 'speech nasal and guttural',(108) 'speech thick and nasal',(109) 'some guttural sounds',(110) 'can manage the labial and dental sounds ... difficulty with the gutturals'.(111) The only quoted examples, though, of aphasic speech in an approximate phonetic spelling are to be found in the work of Hughlings Jackson and the two Ogles:(112) CANDLE is transcribed to indicate the pronunciation 'carsel', MEDICINE 'mesin', CAUSED 'called', and OXFORD-STREET 'Offord-Street'.

Yet alongside such evidence of the awareness of the existence of phonetic concepts in the 1860s, one finds a journal such as the Lancet devoting space to a short article on the 'mechanism of speech', in which phonetics and concepts from phonetics are never once mentioned.(113) Speech, it seemed, could be understood from a knowledge of the workings of the chest, abdomen, trachea and larynx. Not even the mouth, let alone the brain, is taken into consideration! That such an article should appear in print may well have reflected the lack of understanding amongst the medical profession generally as to how speech was produced.

In other works of the 1860s, and occasionally later on, one finds further examples of unfortunate misunderstandings about the nature of speech. For example, one is told that ' [the child's] first utterance is a simple dental sound, which may be represented by the word coo',[114] or that the word JAMES contains an 'open vowel'.[115] And running through a number of works, almost like a cliché, is the phrase 'labial and dental [and guttural] sounds'.[116] Is this evidence of some knowledge of phonetics? Did it reflect an understanding of how speech may be described in objective terms, or was it a piece of window-dressing to give the semblance of knowledgeability?

The 1870s were to bring remarkable changes in attitudes towards phonetics, however. The terminology became more obviously phonetic: 'letters' give way to 'elementary [articulate] sounds'; the existence of dynamic factors in speech and their possible disturbance in aphasia is commented on (see below); and fairly complete tabulations are presented of the phonemic systems of a form of Southern English.[117] Of the handful of clinicians who acknowledged the need for a phonetic point of view in aphasia studies, the person who did most to impress upon his colleagues its value was a London clinician, John Bristowe, in one of the St. Thomas' Hospital Reports[118] and also in part of the Lumleian Lecture series he gave in 1879.[119] In words which anticipate the more famous ones of Henry Sweet on the ignorance of phonetics amongst the general educated public, Bristowe was complaining in 1870 that 'comparatively few even well-educated men ... have given much thought to the subject, or are capable of analysing offhand the compound sounds which they speak, far less, therefore, of

using that power readily as a test of an aphasic patient's capability of speech or for his education'.(120) He continued by drawing attention to the 'ignorance on the part of the physician ... of the mechanics of articulate speech'.(121) He then set out an analysis of some English and non-English vowel sounds, and established quite correctly the majority of vowel phonemes of R.P.(122) The only draw-back to this article - and it is a serious one at that - is that having pointed out the enormous contribution that phonetics can make to the analysis of aphasic speech, he completely failed to put this precept into practice!(123)

In his Lumleian Lectures of 1879, he covers the same ground as before, with the addition of some remarks on the prevalence of intrusive /r/ in contemporary educated speech. Nevertheless, these Lumleian Lectures are of significance, because they constituted the first occasion on which phonetics was brought directly to the attention of a large medical audience through the medium of the widely circulating BMJ.

It may be as a direct result of Bristowe's interest in phonetics that other clinicians became aware of the subject and attempted to use certain concepts from it in their clinical work. Thus, Sutherland, although only quoting Bain's English Grammar as his source of information, goes into considerable detail about the phonetic changes in his patient's speech, or what he calls 'her extraordinary mispronunciations of consonants'.(124) On the Continent, the French clinician, Gallopain, whose work was published in précised form in Britain, used only phonetic principles in setting up eight forms of what he called

'dysphasia' - that is, in present-day terminology, dysarthria.(125) Also, two other clinicians, Combemale and Stembo, were to draw attention to the phonatory qualities of their aphasic patients' speech.(126)

The British clinician who did most to focus attention on the supra-segmental aspect of aphasic speech (and in fact the first to do so in the 19th century) was Broadbent. He pointed out that the 'intonation' used by the aphasic should be considered in the course of any assessment of the aphasia,(127) and in his description of four particular cases of aphasia showed that he appreciated the need to pay as much attention to dynamic and voice quality features as to the more obvious lexical, grammatical and segmental phonological ones. An examination of the actual phraseology he employed reveals that he distinguished between the phonatory, articulatory and voice quality components of speech.(128)

There is no evidence that clinicians went as far as using phonetic transcription in their work. The nearest one comes to it is when Broadbent attempted to reproduce the jargon of one of his patients by using traditional orthography and accents: 'So sur wisjee coz wenement ap ripsy fro fruz fenement wiz ā seconce coz foz no Sophias ā thee freckled pothy conollied ...'.(129) The interpretation is: 'You may receive a report from other sources of a supposed attack on a British Consul-General'.

4.6.5.2 One possible explanation for the limited use made of phonetics

One of the many possible reasons for the comparative reluctance of the medical profession in the 19th century to employ phonetics in the description of cases of aphasia (and, more particularly, dysarthria) may have been the unsettled state of the terminology that was in use. An examination of the terminology of stop consonants is a case in point.

Looking only at the classification of manner of articulation, we find the following confused situation. Various authors continued to use the long established term from the 18th century and earlier, namely 'mutes'.(130) Others, however, referred to 'explosive consonants'.(131) To distinguish between the voiceless and voiced sets, the terms 'mute' and 'semi-mute' were sometimes used.(132) Alternatively, the voiceless set were labelled 'mutes' and the voiced set 'explosive semi-mutes'.(133) If the superordinate term was now changed from 'mute' to 'explosive', then [p,t,k] became 'explosive mutes' and [b,d,g] 'explosive sonants'.(134) But another way of expressing this was to say that the voiceless set were 'aspirate explosives' whilst their voiced equivalents were 'simple explosives'.(135) Whilst still retaining the term 'explosive' for all six sounds and using 'aspirate explosives' for [p,t,k] , the voiced set now became 'orisonant explosives'.(136) The next change was to use 'explodent' instead of 'explosive' or 'mute',(137) and it is at this point that the words 'explosives' and 'explodent' give way to 'mute'. By 1863 [p,t,k] were 'perfect mutes' and [b,d,g] 'imperfect mutes'.(138) However, [p,t,k] were also referred to, simply, as 'mutes' whilst [b,d,g] were 'vocals'.(139) (In passing we can note that the term

'vocal' had earlier been used for any consonant which was not a stop or a voiceless fricative).[140] With the publication of Bell's Visible Speech in 1867, however, the term 'shut consonant' came into use.[141] But in the following year the terms 'abrupt' and 'vocal' were being popularized for the voiceless and voiced sets respectively.[142] By 1873, [p,t,k] were 'sharp mutes' and [b,d,g] 'flat mutes'.[143] Sweet, however, preferred either Bell's 'shut' or his own term 'stopped' consonants.[144] At the same time, the term 'momentary' alternated with 'mute' and 'explosive',[145] and, of course, with Sweet's two terms. Eventually, Sweet's 'shut' consonant became the established label until it, too, was supplanted by 'stop' and 'plosive' at the turn of the century.

4.6.6 Recommended reading on language

Short of a good working knowledge of traditional grammar, of phonetics and some psychology, how might a clinician have set about developing the necessary intellectual background in language-study in order to study aphasic speech? The BMJ addressed itself to this question in an editorial in September 1866.[146] Certain texts were recommended as being, individually, 'of the highest value', 'of the very greatest importance' for an understanding of the nature of language. It is salutary, however, to compare the opinion of them in the BMJ editorial with their actual content.

Three works in particular are singled out as being 'of the highest value': J.S. Mill's A System of Logic (1862), William Thomson's An Outline of the Necessary Laws of Thought (1860) and Richard Whately's Elements of Logic (1844). From their titles it is clear that language would be discussed under the general rubric of logic, but even so, there is scarcely a sentence in any of them that could conceivably have helped a clinician to describe and explain the linguistic symptoms of his patient(s).

Whately makes essentially three points: (i) the process of thinking relies heavily on the use of language; (ii) language has various functions (for example the conveying of information from one person to another); and (iii) the subject of 'Grammar' deals with 'language universally'.(147) Apart from the inference that a disturbance of language must automatically mean some reduction in the powers of thinking, there is nothing in the whole of the work that can be construed as being of immediate relevance to the clinician.

Thomson is marginally more helpful. The reader is told that the function of language is to 'represent the internal process of thinking'; that many languages contain instances of ambiguity (e.g. 'the love of God'); that as a language becomes morphologically less complex, so there is a proportionate increase in syntactic complexity; and that two different 'Parts of Speech' analyses are possible, Aristotle's and Condillac's.(148) According to Thomson, the function of 'universal Grammar' is 'to examine the means of oral and written communication'.(149) Finally, there are sections on the origin and development of language and suggestions for further reading, such as the works of Trench and Max Müller.(150) In comparison with Whately's work, Thomson's might be considered to be of more overt value to a clinician, since it explicitly introduces topics such as morphology, syntax, parts of speech and universal grammer.

J.S. Mill's classic work on logic (1862) contains lengthy sections on propositions (logical propositions, that is), together with some suggestions for the sub-classification of names.(151) But even allowing for the fact that information on propositions and naming might be considered relevant for a clinician working with aphasics, there is, again, little else in the work that would seem to justify the epithet 'of the highest value' as far as the study of aphasia is concerned.

The BMJ editorial made other recommendations too. A paper by Alexander Bain (1866) on the physiology of the intellect, published some months previously, is cited as being 'of the very greatest importance'; yet it contains practically nothing of relevance. There are some remarks in it which might seem to offer guidance to a clinician, such as 'The mental recollection of language is a suppressed articulation, ready to burst into speech',(152) and 'Our discrimination of articulate sounds is co-extensive with the combined alphabets of all the languages known to us'.(153) But in the absence of any elaborative commentary by Bain, these would not seem to have led in principle to a more discriminating understanding of aphasia.

Another work, described simply as being by Fournié, is recommended on the grounds that it is 'of the most direct value'. This can only be Edouard Fournié's Physiologie de la voix et de la parole (1866). In what precise ways, then, would it have been of benefit to a clinician? It runs to nearly 800 pages, nearly a hundred of which are devoted to acoustics (including musical acoustics). There is also a long section dealing with the anatomy of the larynx and the supra-laryngeal tract. A considerable amount of space (more than 280 pages in fact) is given over to physical theories of voice production, followed by a further two hundred and twenty on the physiological mechanism of phonation. A description of the physiological processes of speech takes up another 200 pages, included amongst which is a fairly elementary account of phonetics.(154) Finally, one reaches a section of little more than 20 pages which deals, in the broadest

terms, with amnesia and aphasia.(155) In the whole of the book, there is absolutely nothing on the nature of language or how it may be analysed. Yet it was this very topic, the nature of language, that was singled out for special acclaim in the BMJ editorial!

Even Tylor's work, Researches into the Early History of Mankind (1870)(156) described as an 'interesting account of language in the widest sense of the word' contains practically nothing that would have appeared useful to the student of "aphasia". Most of the sections of the book that deal with language concentrate on the language of the deaf and dumb, under the rubric of what Tylor calls 'Gesture-Language and Word-Language'.(157)

I have devoted considerable space to a consideration of these recommended works for the student of aphasia, because one perceives a clear discrepancy at this stage in the understanding of aphasia between what an editorial writer, perhaps not intimately conversant with the sorts of problems posed by aphasia, considered to be appropriate for an understanding of the condition and what clinicians, dealing with such cases on a fairly regular basis, found they needed as a suitable intellectual apparatus with which to try to understand realistically the concept of a language breakdown.

4.7 Concepts of aphasia

4.7.1 Definitions and interpretations of aphasia

From 1864 onwards, clinicians in the British Isles became quickly aware of the existence of the term 'aphasia' and of the way (or ways) in which it was being employed. It first appeared in print

in the Medical Times & Gazette on 14 May 1864,(158) but it was Hughlings Jackson who brought it firmly to the attention of his British medical colleagues in a letter that appeared in the British Medical Journal the following week.(159) He defined it as a 'more or less complete loss of the power of speech'. It did not, however, immediately replace other, older, terms. Thus, apart from the continuing use of, for example, 'loss of speech', the long-established word 'aphonia' remained in currency as an alternative to aphasia for some time after the introduction of the latter. James Russell, for example, defined 'aphonia' as a 'loss of speech from causes seated in the nervous system'.(160)

The word 'aphemia' (from Broca's 'aphémie') was introduced into British medical terminology by Jackson, some three months after he had alerted his colleagues to the existence of 'aphasia'.(161)

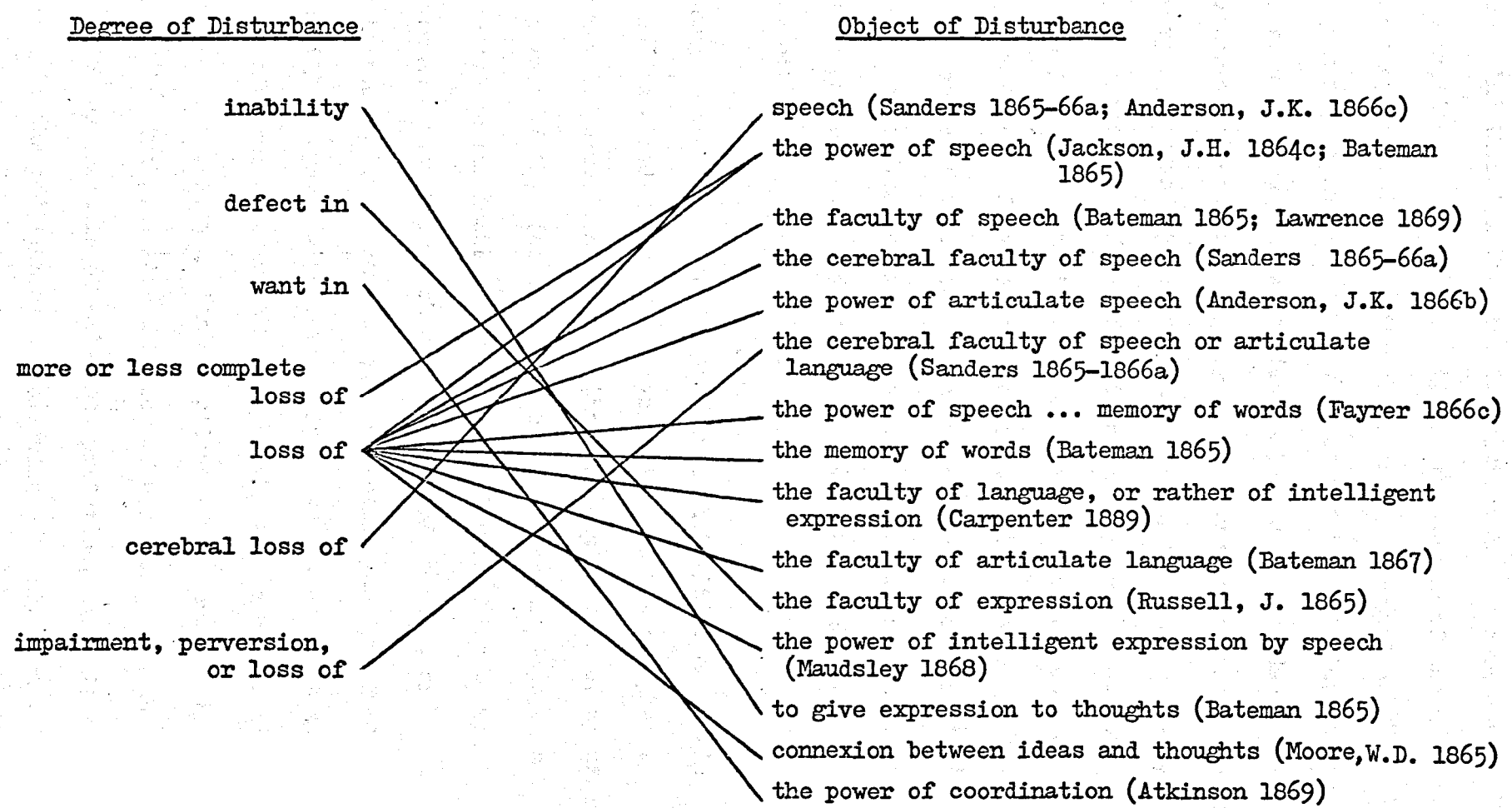
The first clinician to use the term 'aphasia' as if it had already firmly established itself in medical nosology was John Popham, a physician from Cork. He used it in both the title and the subject-matter of a short report he published on the effect of poison on speech.(162) Ironically, his usage would probably not have universal sanction nowadays. Within the space of the next few years, however, the term 'aphasia' took root such that 'aphemia' suffered considerable eclipse, being replaced by terms like anaudia, alalia, aphrasia, aphthongia and aphthenxia as well as, of course, by aphasia.(163) In addition, a whole set of labels for varieties of 'aphasia' was spawned. By the end of the decade, 'aphasia' 'was being sub-classified as 'ammemonic', 'amnesic', 'atactic', 'ataxic', 'Class I', 'Class II', 'lethological' and 'simple'.(164)

An analysis on a chronological basis of the implication of the terms that were used to describe the object of the disturbance in aphasia reveals an interesting pattern. In 1864 'aphasia' had to do with a disturbance of the 'power of speech'; this conceptualisation continued into 1865 and 1866. But by May 1865 other terms began to appear: 'faculty of speech', 'memory of words', 'inability to give expression to thoughts'. In August of the same year, one finds 'connexion between ideas and thoughts' in use. Then, the next month, September, 'faculty of expression' appeared. 1866 is noticeable for the inclusion, in the definitions, of the words 'cerebral' and 'articulate': thus 'cerebral faculty of speech', 'cerebral faculty of speech or articulate language', 'power of articulate speech'. (The reason for the term 'articulate' was possibly connected with the publication earlier that year of the English translation of Trousseau (1865), in which the term is used extensively. On the other hand, 'articulate' had been used in case-reports and discussions of "aphasia" in the pre-1864 period.)[165] In 1867, the definition was abbreviated to 'faculty of articulate language'. Then in 1868 and 1869, the words 'intelligent' and 'intellectual' were added: 'power of intelligent expression' and 'faculty of language or rather intellectual expression'. (The latter word, 'intellectual', undoubtedly derives from Jackson's usage.) The various definitions are set out in Figure 11.

At this point it is well to note that 'aphasia' was being used for a range of disturbances, varying in severity and covering what today is sometimes divided into aphasia and dysphasia. (The latter term appears to have been first used in print in the British Isles in 1874.)[166] Secondly, that it was regarded as an expressive

Figure 11

DEFINITIONS OF 'APHASIA' 1864-1869



disturbance. And thirdly, that the definitions do not necessarily encapsulate any discussion in the articles themselves of the nature of aphasia: they generally take the place of any discussion.(167) From this, one may perhaps conclude that at the time clinicians saw no need to enlarge upon the definitions - they were considered to be self-explanatory; alternatively, they themselves were not in a position to enlarge upon them in any detailed and meaningful fashion due to the lack of any established and agreed opinion on what was meant (or merely implied) by the terms 'faculty of speech' or the 'power of articulate language'. Considering the state of linguistics in the 1860s and the sorts of questions it was addressing itself to,(168) there is ample justification for the reticence and/or inability of clinicians to enlarge upon the question of what was meant by a disturbance of 'language' and so on.

Turning to the literature of the period 1870-1894, no single trend can be discerned in the way in which the concept of aphasia was interpreted, apart from the fact that the explanation of aphasia as a disturbance of the 'faculty of intelligent speech' enjoyed a brief vogue during the 1880s.(169) The majority of authors were content with an explanation such as a 'defect of speech', or, reverting to the earlier terminology, a defect in the 'power of speech' or the 'faculty of speech'. Occasionally, however, as if to avoid what were fast becoming somewhat hackneyed phrases, a different phraseology was used, such as 'interruptions to the nervous functions of speech'.(170) One sees also a number of cases in which the term 'speech', which was capable of wide interpretation, was deliberately circumscribed by the addition of a qualifying element. Thus, for

some authors, the characteristic of aphasia was a disturbance of the 'power of speech from injury to the speech centre'[171] or 'loss of speech, without paralysis of the lips and tongue'.[172]

The definition of aphasia as a 'loss of voluntary speech'[173] represents, from the point of view of phraseology, an innovation; but in content it merely echoes ideas that had been current for almost thirty years.

The most radical definition (from the point of view of actual terminology) must have been that used by the French clinician Charles Richet: aphasia was the 'loss of ideo-motor coordination ... the fracture of the psycho-motor centres'.[174] Although not strictly equatable with Broca's concept of aphemia, it did have the advantage of being more specific in content than looser terms such as 'defect of articulate speech'. It was never used, however, in print in the British Isles. (Richet's work was published in the United States.)

Few clinicians were prepared to recognize the existence of conflicting definitions of aphasia. Indeed, the only person to set out the different approaches was F.P. Foster, in a dictionary definition of 'aphasia'. It might be used (and had indeed been used), he said, in three different senses: (i) to refer to 'any impairment of the power of speech'; (ii) in Trousseau's sense of 'an abolition or impairment of the power of articulate speech ...'; and (iii) as 'a diminution or perversion of the normal faculty of expressing the ideas by means of conventional signs'.[175]

As in the period from 1864 to 1869, the term 'speech' figures in most of the definitions between 1870 and 1894. In some, however, a number of characteristic phrases from the 1860s are used, including 'faculty of language' and 'articulate language'.(176) It is of interest to note that since the turn of the century aphasia has generally been defined with reference to 'language' and not, as in most of the case-reports and discussions between 1864 and 1894, to 'speech'.

There was, then, no agreed definition of aphasia; nor, in a sense, could there have been, given the state of linguistic theorizing at the time.(177) It must, therefore, be considered sadly ironic that during the pericd from 1864 to the late 1870s, when, on the evidence of the published case-reports and discussions, aphasia was a subject attracting considerable attention from many clinicians, linguistics was not in a position to provide much needed guidance on either the nature of language or the methods of analysing it synchronically. And so, one finds clinicians paying a certain amount of lip-service to linguistics,(178) or else using a modicum of traditional grammatical terminology in their assessments of patients;(179) whilst at the same time their colleagues in linguistics busied themselves with speculating on how language originated or how languages may have been related to one another at an earlier period in history.

4.7.2 Is aphasia a 'loss of words'?

With the hindsight of many decades of research into aphasia following the 1890s, one can discern in the unfolding development of aphasia studies in the period up to 1894 certain key issues which were briefly touched upon, but whose relevance for an understanding of

aphasia as a whole was scarcely appreciated. One was the nature of the actual disturbance to the aphasics' linguistic capacities; the other was whether different linguistic modalities were integrally linked together within the scheme of language functioning.

Had the aphasic lost words, or the memory of words? One possible method of answering this question would have been to have questioned those aphasics who, following recovery, were intellectually and emotionally competent enough to reflect on their condition and to assess it in a reasonably rational manner. As I have indicated elsewhere,[180] the evidence of autopathography, although never sufficiently accurate to allow one to reach a definitive conclusion about the nature of aphasia, nevertheless provides some persuasive evidence in favour of the view that distinct types of aphasia, unrelated to the expressive/receptive dichotomy, for example, may be considered to exist.

The accounts related by Scoresby-Jackson, Alexander Robertson and James Bramwell are of considerable interest, for in certainly two of them the descriptions of the aphasia clearly contradict what had by that time emerged as the fairly typical view, namely that aphasia was a 'loss of the memory of words'. Robertson quotes the comment from one post-aphasic:[181] 'I had the words in my mind, but I could not speak'[182] and Bramwell that of an post-aphasic who appeared to have 'the words in his mind' but was unable to say them.[183] On the other hand, he mentions a comment from the same patient, which would, in turn, suggest that the standard view of aphasia was the correct one: 'I attempted to pray mentally, but failed, not from any confusion of ideas, but from some inexplicable cause - possibly from the want of words to convey my requests'.[184]

Nevertheless, other statements would appear to confirm the existence of what has recently come to be known as 'performance aphasia'.(185) Thus, one finds such accounts as the following '... a patient under my care ... who has recovered, to a great extent, from severe aphasia, gave me a similar assurance, viz. - that though speechless, she was not wordless';(186) '... the testimony ... is explicit - that they know what to say, only somehow they could not get the words out';(187) 'She knew perfectly well that she was omitting those words ...'.(188) Had clinicians paid further attention to this question of the nature of aphasia as revealed by autopathographical accounts, then there might well have resulted the setting-up of distinct types of aphasia: one in which 'words' were simply unavailable to the person, either because they had been destroyed by the brain-damage or because they remained inaccessible to the person; the other in which the defect lay in the ability to express the words. Quite apart from parallels with the competence versus performance view of aphasia, one also sees here the basic features of the later theory of a distinction between 'pure' aphasia and dyspraxia. It was apparently only Hughlings Jackson who perceived the relevance of such a distinction.(189)

4.7.3 Relationship of the semiotic modalities to one another

The second key-issue was the relation of speech to other semiotic modalities: were they related to each other, and if so, how? The importance of establishing the nature of any connection between the different modalities was crucial to the whole topic of language localization. Unfortunately, the only clinician who attempted to consciously incorporate this concept into his theory of aphasia was Bastian.(190)

4.8 The interpretation of Broca's views and the data on 'language' localization

In Chapter 3, it was shown how Broca's views on the localization of 'la faculté du langage articulé' underwent certain changes depending on the cases that he and his colleagues examined at autopsy. Two broad generalizations can, however, be made for the purpose of comparing his ideas with the interpretations that were put on them by British clinicians. Firstly, he insisted on the need to make a sharp distinction between 'la faculté générale du langage' and 'la faculté du langage articulé'. Secondly, he concluded that at least part of the left inferior frontal gyrus and possibly also some surrounding brain tissue was 'le siège de la faculté du langage articulé'.

As mentioned earlier,(191) Broca objected to the interpretation that Trousseau put on his work, especially his equation of 'aphasie' with 'aphémie'. It is, therefore, important to note that Broca's views were not put before the British medical public by Broca himself (except at the British Association meeting in Norwich in 1868), but through the medium of a work by Trousseau which included a major chapter on the subject of aphasia. Unless a medical man in the British Isles had a reasonably good knowledge of French and hence could have read Broca in the original, he would have learnt about Broca's views (or at least the distillation of Broca's views with Trousseau's own added) via Trousseau. It is necessary, then, to consider Trousseau's work in order to see how it presented Broca's hypotheses.

4.8.1 The interpretation of Broca's views in Trousseau's 'Lectures on Clinical Medicine'

Trousseau's Clinique Médicale de l'Hôtel-Dieu de Paris, a series of lectures given by him at the Hôtel-Dieu, one of the teaching hospitals in Paris, was first published in 1861. It contained nothing on the subject of neurolinguistics. However, the second edition of 1865 included a 55 page summary of what Trousseau considered to be the state of knowledge at that time about aphasia. Parts of this second edition appeared in an English translation in 1866 and included the chapter on aphasia.(192)

An idea of how the work was received in the British Isles may be gauged from the comments about it in the BMJ and the Lancet. The former said little about the section on aphasia, beyond that Trousseau had 'paid a great deal of attention' to the subject;(193) the latter, however, went into more detail, stating that this particular chapter, together with two others from the seven so far published, would be one 'which many will deem the most important in the book'. The reviewer then went on to notice that Trousseau 'gives various cases of aphasia, which do not coincide with the doctrine that the faculty of speech has its seat in the left frontal convolutions'.(194) Of particular interest here is the use of the terms 'doctrine' and 'faculty of speech'. Broca's views, as we have seen, were clearly not formulated so tightly that they could be considered to be a doctrine; nor did he refer to the faculty of speech ('la faculté de la parole'in Trousseau's original).

There are a number of major differences between Broca's and Trousseau's conceptions of aphasia.(195) For one, Trousseau's equation of his own 'aphasie' with Broca's 'aphémie'(196) is, as indicated earlier, incorrect. Secondly, the material covered by Trousseau is wider in scope than that in Broca's work. Trousseau is as much concerned with lexical, grammatical, kinesic and intellectual disturbances as with articulatory ones. Thus, he refers to 'incomplete or incoherent sentences', to people who have 'lost the faculty of speech' and so on.(197) The third major difference between him and Broca lies in the actual type of disorder being described and discussed. Certainly, Broca's aphemia is included within aphasia - the 'inability to co-ordinate the movements which are used in phonation'(198) - but Trousseau's definition of aphasia (ironically, first presented <u>in extenso</u> almost at the end of the work) embraces a much wider syndrome than Broca had concerned himself with: 'Aphasia consists in loss of the faculty of expressing one's thoughts by speech, and in most cases, also, by writing and by gestures'.(199) Trousseau attributed this to defects of 'memory' and 'intellect': '... in Aphasia loss of memory plays the principal part'.(200) And his examples of aphasia, drawn from a variety of case-histories, illustrate the range of linguistic and non-linguistic defects that are encountered.(201)

To the British reader, very likely unfamiliar with the original texts of Broca's work,(202) aphemia would be taken to be synonymous with aphasia, and it would be regarded as having to do with 'loss of speech', 'loss of words', 'incomplete sentences', 'inability to articulate', 'forgetfulness' etc. It is scarcely surprising, then,

that Broca's narrowly limited field of investigation, the localization of but one aspect of the speaking process, was indiscriminately extended to cover the whole gamut of factors involved in speech production.

A more disciplined discussion of aphasia is not found in Trousseau's Lectures. Phrases are bandied about without explanation, as though their import were well understood. Thus, one finds 'faculty of Articulate Language', 'faculty of articulate language', 'faculty of speech' and 'faculty of language as expressed by writing'.(203) If the reader had followed the text closely, and had wondered what the terms actually referred to, he would have been given no guidance.

Broca's work, although moderately well summarized, is, nevertheless, regarded as resulting in the establishment of an 'anatomical law' or of a 'strange doctrine'.(204) And although Trousseau allows Broca the credit for being the first to suggest that the 'seat of the manifestations of thought by speech' is in the posterior section of the left inferior frontal gyrus,(205) he is scarcely lucid in the way in which he balances the arguments for and against Broca's contention. Five pages are given over to a discussion of cases that contradict Broca's hypothesis, yet Trousseau then concludes that 'the most frequent seat is the posterior part of the third left frontal convolution'.(206) Almost twenty pages later, this might appear to be modified (although in fact it is merely expanded upon, nothing else), when Trousseau notes that damage 'more deeply situated, such as the insula of Reil and the corpus striatum, can bring on Aphasia'.(207)

In summary, one can say, firstly, that Trousseau was merely repeating what British clinicians might have known already: that in aphasia, the modalities of speaking, writing, speech-comprehension, reading, and gesture may be affected in varying degrees; that there may also be problems of paralysis and deglutition; that an area other than the left inferior frontal gyrus may be the site of the lesion. Secondly, what he emphasizes (although the same ideas had been current in the British literature for many years) is that to understand aphasia one needs to adopt a strongly psychological, rather than a narrowly physiological, point of view. Whereas there was uncertainty about the actual location of the damage that caused aphasia (or, more specifically, aphemia), there seemed no doubt that in psychological terms, the condition could be attributed to defects in particular types of memory.

The picture of aphasia as painted by Trousseau, although irreproachable in itself, cannot be considered to reflect primarily Broca's views; and yet particular mention is made of him. For an uncritical reader or one who was unfamiliar with the original texts of Broca's papers it would have been natural to conclude from Trousseau's Lectures that Broca had researched the concept of aphasia as a language disturbance arising from a lesion in the left inferior frontal gyrus.

4.8.2 The use of the distinction between the two 'facultés'

Returning now to Broca's views, not Trousseau's interpretations of them, one finds that a small number of medical writers in the British Isles understood the nature of the distinction Broca had made

(and indeed was still making at this time) between the two 'facultés'; further, that they considered it to be of relevance in neurolinguistic studies. Thus, in 1864, Hughlings Jackson pointed out that the 'general faculty of language' was not to be confused with the 'faculty of articulate language'.(209) He defined an impairment of the latter (not completely accurately but nevertheless in the spirit of Broca's own concept) as a 'loss of guiding power in the articulatory apparatus'.(210) Another clinician, Thomas Hayden of Dublin, gave a more accurate definition of the condition that arises from a disturbance of this 'faculté'. He wrote of a 'loss of that coordinating power which we possess over the muscles of the organs of speech',(211) and defined it even more accurately, as a 'loss of the power of motor coordination of the organs of speech'.(212) There appeared, however, to have been only one case in which the distinction between the two 'facultés' was used in the British literature. Fox described how his patient had 'lost all articulate speech', but not 'the general faculty of language'.(213) Bateman, too, despite his considerable reservations about the validity of Broca's views on the actual localization of 'la faculté du langage articulé' nevertheless accepted that the distinction between the two 'facultés' 'must be observed'.(214)

4.8.3 Misinterpretations of the two 'facultés'

Nevertheless, considerable misunderstanding existed elsewhere about the import of the terms, as if the authors had not fully understood Broca's intentions or, for one reason or another, were adjusting the application of his concepts. Thus, Jackson refers to Broca's ideas in connection with the 'faculty of speech'.(215)

Banks defines 'aphemie' [sic!] and its synonym (!) 'aphesia' [sic!] as the 'loss, impairment or perversion of speech'.(216) Anderson, however, completely confuses the concepts alalia, aphemia, aphasia and verbal amnesia, regarding them all as synonyms.(217) Similar, but less drastic, confusion is to be seen in an editorial on aphasia by the British Medical Journal, in which the 'faculty of articulate language' is regarded as equivalent to the 'faculty of language'.(218)

Yet more examples of misinterpretation on a matter where accuracy was essential, can be found in a report published in the BMJ about the open letter Broca had sent Trousseau on the most suitable term to use for the condition he was describing: should it be 'aphémie' or 'aphasie'?(219) According to the BMJ, all of the suggested terms referred to 'loss of voice'.(220) A second example appeared in the Medical Times & Gazette in 1867 in which a reference was made to Broca's 'well-known paper on Aphemia'.(221) By the time the MTG published this comment (February 1867), Broca had in fact written fifteen papers on the subject! Perhaps not surprisingly, then, the report goes on to describe aphemia as a 'disorder now more generally known under the name of Aphasia'. Where it does manage to be correct is in its remark that Broca's views were 'hypothetical'!(222)

The greater the chronological gap between the exposition of Broca's views and the later interpretation of them in the British medical literature, the greater the likelihood of distortion, especially if they were viewed against the background of more recent studies. Fortunately, what distortion there was was small compared to the basic accuracy with which his views were reported in the 1870s onwards. This, in fact, helps to correct the opinions and misopinions

of him and his work that had acquired a certain currency in the 1860s. Thus, his concept of the left inferior frontal gyrus being the 'le siège de la faculté du langage articulé' was translated and reported accurately as the 'seat of the faculty of articulate language' by a number of clinicians in the late 1880s and early 1890s.(223) Even descriptions such as the 'close functional relation with articulate speech [and] that part of the upper edge of the fissure of Sylvius';(224) the left inferior frontal gyrus being the 'organ of articulate language',(225) or the 'faculty of language' or the 'faculty of speech' being in the same gyrus(226) indicate that the essential feature of Broca's theory was understood.

Or was it? Because the British clinicians used the correct name 'faculty of articulate language', there is in fact no evidence whatever that they understood by it what Broca (but not all of his French colleagues) understood by 'la faculté du langage articulé': none of them, after the 1860s, ever defined the term.(227) For this reason one cannot be certain whether they were using it in the sense of the muscular coordinating capacity or as a generic term for <u>all</u> of the factors involved in the production of speech.

4.8.4 <u>Bateman's attempts to explain the nature of the two 'facultés'</u>

An example of the muddle and confusion that surrounded the concept of 'Articulate Language' and terms related to it can be found in a work by Bateman that deals not with aphasia in particular but with the evidence presented by language in the contemporary debate on the validity of Darwin's theory of natural evolution.(228) The reader is confronted by a veritable barrage of technical terms (some with

initial capital letters as if to underline their importance), including 'faculty of Articulate Language', 'Faculty of Language', 'faculty of language', 'Speech', the 'faculty of speech', 'Language', the 'faculty of articulate language and the general faculty of language', 'Articulate Language', and 'Articulate Speech'.(229) One is told that 'When we talk about the faculty of speech', we may have no 'clear and definite notions as to what we mean',(230) but Bateman scarcely offers any enlightenment! Similarly, he admits that considerable 'ambiguity and confusion' surrounds the term 'Faculty of Language',(231) but again he does not even attempt to unravel the difficulties. And at one point, he maintains that he has already defined 'the faculty of Language'; but no definition can be found in any of the previous (or following) pages!(232) He quotes, in English translation, Broca's distinction between, and definitions of, 'la faculté du langage articulé' and 'la faculte générale du langage', saying that the distinction is an important one; yet he never tries to elucidate it or to relate it to the variety of other terms he has introduced.(233) And, in a section of the book dealing with the localization of language, he equates the 'Seat of Articulate Language' with the 'Seat of Speech', the 'seat of language', the 'Seat of Language' and 'the speech centre'.(234) In fact, at only one point in the entire work does he provide a definition of any of the terms he has used. He states that 'speech or language consists of a series of conventional sounds, which represent a meaning which the mind has previously attached to their expression', and goes on to say that there are 'two distinct features in speech': 'an act of the intelligence, and a sonorous mechanism'. The former he glosses as 'cognitive', 'thought-speech', 'internal speech'; the

latter as 'executive', 'spoken-speech', 'external speech', 'the material part of language'.(235)

In a sense, the main thesis of Bateman's work is in no way belittled by the profuse and mostly unclear terminology that he uses, since essentially what he is saying is that no animals can speak, and therefore Darwin's theory that man descends from the animal kingdom is untenable. But as an example of how so little attention was paid to clarifying some of the central terms in neurolinguistics, and therefore of how an entire area of study could be built up on inadequately scrutinized premises, it is a highly illuminating work.

4.8.5 Gradual redefinition of Broca's thesis

As the years passed, a gradual re-definition took place of Broca's position. One finds, for example, comments such as the 'third left frontal convolution' is 'the motor centre or will centre',(236) and in right-handed people the 'third left frontal convolution' is responsible for 'articulate language' whereas the reverse is the case with sinistrals.(237) Then there are cases of what can only be described as distortions of Broca's premise. David Ferrier defined 'Broca's aphasia' as 'the inability to express thoughts in articulate speech, or to think in words, and all that this implies';(238) and Ross was under the impression that 'Broca thought that all aphasic disorders of speech were caused by disease of this part [i.e. the left inferior frontal gyrus] of the brain'.(239)

4.8.6 The 'narrow' and 'extended' versions of Broca's thesis

As described in Chapter 3, changes occurred during the nine years in which Broca set out his major statements on the form of neurolinguistic correlations: both in the actual type of disorder he was describing (aphemia, with occasional hints about syntactic and intellectual disturbances), and also in the areas of the brain in which he located the damage that caused the aphemia. It is important to remind ourselves that the left middle frontal gyrus, the insula, the parietal lobe and the right hemisphere as well as the left inferior frontal gyrus were mentioned in this context. It may well be, therefore, that British clinicians became aware of Broca's views especially at the times they diverged from the 'standard' position: namely that the seat of the faculty which coordinates the muscular movements of speech lies in the posterior third of the left inferior frontal gyrus. In order to investigate this possibility as well as to distinguish between the view that Broca clung to, despite occasional doubts, and later interpretations of it deriving primarily from the work of Trousseau, the terms 'narrow' and 'extended' will, henceforth, be used. The 'narrow' view was entirely Broca's: that the faculty of coordinating the necessary muscular movements for speech lies in the left inferior frontal gyrus. The 'extended' view is, in fact, an amalgam of different opinions. Some were Broca's: for example, the middle gyrus may play a role in 'la faculté du langage articulé'; there may be syntactic disturbances in aphemia, and so on. Others were attributed, wrongly, to him.

4.8.7 The neurological evidence in favour of the 'narrow' thesis

In the whole of the British medical literature from 1865 to 1894 there are no reports of aphemia which incontrovertibly support the 'narrow' version of the theory; some, however, do provide a degree of confirmation of it.

William Ogle described 18 cases, in the first of which the patient produced only monosyllables; there was also partial dysgraphia; the left inferior frontal gyrus was found to be softened. Of the other 17 cases, twelve were ones in which the same gyrus was found to have been damaged; in the remaining five, there was a 'probability' that the same area had been damaged.(240)

McCarthy reported the case of a man who, after a head-injury, became 'unable to speak'. Later, a clot was found in part of the lobe 'corresponding to the interior and posterior part of the external frontal convolutions and very closely bordered on the central lobe'.(241)

The Irish clinician McDonnell reported a case of 'aphasia', which, superficially, would seem to have provided evidence in favour of the 'narrow' theory. (Broca and his theory are never mentioned; the relevance of the case has been extrapolated.) The 'only sounds [the patient] could articulate were ti-ti-ti'. (The parallel with Broca's Leborgne is striking.) It was subsequently found that the whole of the left inferior frontal gyrus had disappeared entirely. There were, however, - and this in itself raises further questions - lesions in the pons, medulla and spinal cord.(242)

A case reported by Magnan, although somewhat sparsely described, may be confirmation of the 'narrow' version. A 'large glioma of the dura mater' was found to have 'penetrated deeply into the third cerebral convolution'.

Assuming that by 'cerebral' the frontal is intended, secondly that the left hemisphere can be taken for granted, and thirdly that aphemia, not aphasia, was the linguistic feature, then this would seem to support Broca.(243)

A very brief remark in another report that a case of 'aphasia' was caused by a 'tumour of the left anterior convolution' may also be seen as possible evidence in favour of the 'narrow' version of the theory.(244)

4.8.8 The neurological evidence in favour of the 'extended' thesis

Evidence in support of the 'extended' version was considerable. Thomas Hayden described a case of 'aphemia', in which the woman was 'unable to speak', as a result, he said, of a 'loss of that coordinating power which we possess over the muscles of the organs of speech'. At autopsy, it was found that the middle as well as the inferior left frontal gyri had been 'effaced' and that, additionally, the insula had been completely obliterated.(245) A second case reported by him might seem to have been a classic example of the 'narrow' version of Broca's thesis: the woman's 'mind seemed full of ideas and the proper words to express them', but she had 'lost ... the mode of enunciating [words] '.(246) This latter he attributed to 'loss of the power of motor coordination of the organs of speech'. But her left middle not just her inferior frontal gyrus was found to be 'disorganised and obliterated'. Similarly, Banks reported a case in which the patient had succeeded in producing only 'disconnected

monosyllables', which were later shown to have been the result of damage in the left middle and inferior frontal gyri (as well as of a small clot in the middle cerebral artery). He nevertheless said that the case provided 'general support for Broca and Jackson'.(247)

In all of the other cases, confirmation is provided for what is, despite the views of the authors themselves, strictly speaking, an extension of Broca's narrowly defined aphemia hypothesis. Thus, Russell found evidence in the form of a'cavity in the left anterior lobe' which 'appears to support M. Broca's hypothesis'. The patient was, in fact, a case not only of aphemia but of verbal amnesia too: he used 'wrong words ... "contrary" words ... [his] memory was bad ... [and there was a] loss of words especially names'.(248) Sanders was similarly of the opinion that his case 'confirm[ed] so precisely M. Broca's views as to the localization of the seat of the cerebral lesion in Aphasia',(249) although, in point of fact, the 'loss of the memory of words' was 'more marked than the inability to articulate'.(250)

Other examples of this type in which Broca's narrow hypothesis was unwittingly extended to cover verbal amnesia too, but for which the pathological evidence indicated that the person suffered only from aphemia,are those reported by Popham ('defective memory of words' and 'confused articulation');(251) Oedmannson;(252) and Anon. ('lost power of expression').(253)

The cases reported by Lockhart Clarke and T.C. Shaw(254) both concern amnesic aphasia. In Clarke's case, the posterior third of the left inferior frontal gyrus together with the lower part of the precentral gyrus were damaged; in Shaw's, there was degeneration in all three frontal gyri as well as in the insula and the gyrus rectus.

The damage, however, was 'earliest and most advanced' in the left inferior frontal.

Another case, which may support Broca's theory, was that described by the Glasgow physician, Joseph Coats, of a patient who 'roar[ed], scream[ed and] shout[ed], and us[ed] the most filthy obscene language'. The autopsy showed acute meningitis, with a large area of pus 'occupying the membranes of the base just at the fissure of Sylvius ... crowding the convolutions of the frontal lobe forward ... [with] surface irritation of Broca's convolution'.(255)

An additional case, reported by Magnan, was of aphasia and dementia, and the disturbances were attributed to 'osteitis of the left parietal bone which corresponded with that of the ascending portion of the third frontal convolution'.(256)

There was, however, one further, and ostensibly major, source of support for Broca's theory. At the BMA meeting in Norwich in 1874, Bateman maintained that Broca's case was 'not proven'; David Ferrier argued that speech was represented bilaterally, and hence Broca's thesis was too restrictive. Then a 'Dr. Dowse of London' got to his feet to announce that 'in more than 100 cases of aphasia which he had observed he had never failed to justify Broca's conclusions'.(257) We are not told, however, what conclusions of Broca's he had in mind (the 'narrow' or the 'extended' version); nor, of course, can we be certain that he appreciated the implications of what Broca had written on the subject of aphemia.(258) In addition, since his views were reported, not stated in the first person, one cannot be sure that the report was an accurate reflection of what he actually said

at the meeting - we have noted other examples already of where in circumstances which required absolute accuracy of reporting, such a criterion was not met.

In the few years following the emergence of Broca's thesis, a certain cautiousness was sometimes evident. A number of clinicians felt that the evidence was not conclusive either way. Altogether ten of them express this view, although at least two of them (Jackson and Gairdner) altered their opinion in the light of further case studies in favour of the anti-Broca position. The phrases used to describe the partial agreement/disagreement include 'in a general way';(259) 'generally in accord with ...';(260) 'the phenomena observed ... connect, with considerable probability, the entire region with [the] function [of speech]';(261) 'The whole question of localisation ... is still open;(262) 'the third left frontal convolution [is] one of the seats of this faculty';(263) 'Broca's convolution is involved, but more than this';(264) 'great probability to the accuracy of [Broca's] conclusion' (in four out of 25 cases examined).(265) Thurnam does not mention Broca by name, but he quotes a case of aphasia in which the lesion was in the left hemisphere, in the left inferior frontal gyrus but also over a wider, unspecified area.(266) Wilks was not convinced that in all cases of aphasia 'Broca's convolution' would be damaged, but agreed that in some cases it was.(267) Carpenter found that in a 'large proportion of cases' the 'disease [is located] in the posterior part of the third left frontal convolution'.(268)

4.8.9 Support for Broca

As will shortly be made clear, criticism of Broca's theory was extensive. There were those, however, who were prepared to defend him. Broadbent was one of them. He put the case for Broca's point of view very defiantly. Having 'examined all the apparently exceptional cases of which I have been able to find the published record', he could explain the putative objections as follows: some cases of 'aphasia' were, in reality, cases of labio-glosso-laryngeal paralysis; others were of dementia; others were the after-effects of apoplexy or a convulsive attack, and therefore not proper cases of aphasia; others were the result of an 'embolism of the large cerebral artery'; and those that remained could be explained as the result of the 'observer [having] taken some other convolution for the one named'.(269) The defence of Broca by David Ferrier was less principled than Broadbent's: 'if a careful search had been made' of the cases that allegedly contradicted Broca's thesis, it would have been found that the damage lay in the 'subjacent medullary fibres' of the left inferior frontal gyrus.(270) So certain, in fact, was Ferrier of the validity of Broca's theory that he went so far as to describe it as 'no longer a merely empirical generalisation, but a derivative law ... as established on as firm grounds as any other fact in scientific medicine'.(271) The following pages will show that a statement such as this was scarcely justified!

4.8.10 The evidence against Broca's thesis

The evidence against Broca's hypothesis was of three types. One concerned cases of aphasia in which no neurological damage could be ascertained; a second of brain damage that was unaccompanied by

any aphasia; and, a third, cases of aphasia that could not be attributed to lesions in the left inferior frontal gyrus.

The material will be considered under two headings: those case-reports which showed disagreement with Broca's findings; and, secondly, the series of generalizations in the literature which attempted, on the basis of already available evidence, to throw serious doubt on the validity of Broca's point of view.

4.8.10.1 Case-reports

4.8.10.1.1 Aphasia in the apparent absence of neurological damage

A handful of cases were reported in which, at post-mortem, no neurological damage could be detected. Russell, for example, found in three cases of aphasia, accompanied by epilepsy, 'no discernible structural changes in the nervous system'.(272) Gairdner, too, reported a case of aphasia in which 'no trace of softening, tumour or other lesion could be found'.(273) One of Broca's most consistent critics in the British Isles, Frederic Bateman, also found two cases out of a total of twenty-seven bona fide cases of aphasia in which there was 'no appreciable disease of the brain at all'.(274) Nevertheless, how common were such findings, especially since earlier clinicians had reached the same conclusion about the absence of lesions in cases of "aphasia"?(275) A remark by Tuke and Fraser indicates that such cases were by no means as infrequent as might be supposed.(276)

How might the apparent absence of any brain-damage be explained? Few clinicians addressed themselves to this question, but of those who did, Bateman was the only one to put forward a list of possible

explanations: not merely in cases such as these, but generally when the neurological condition of any aphasic was being considered. In addition to damage in the left inferior frontal gyrus, there might also be further damage of a less obvious nature. For this reason, he strongly advocated the need, where necessary, to make a microscopic examination of brain tissue.(277) However, sometimes the microscope might not reveal the altered form of the tissue, and this could then only be assessed by actually feeling it.(278) Other possibilities to bear in mind, either as semi-routine forms of analysis or as possible explanations for aphasic cases in which no macroscopic damage was evident, were, he said, the altered specific gravity of brain tissue and alterations to the electrical and/or chemical functioning of the brain.(279)

These comments are of considerable importance for Bateman was clearly advocating the desirability of extending the format of neurological examinations of aphasics. Where formal clinical methods of assessment did not yet exist (for example, of recording the electrical potential of different parts of the brain), then at least such possibilities should be borne in mind when a conclusion was being sought as to the actual nature of the neurological deficit. On the evidence of the case-reports that were subsequently published by his colleagues, his ideas, unfortunately, appeared to have exerted little influence. His colleagues continued, in the main, to think about the neurological bases of aphasia in terms of the well-established (and easily verified) procedure of macroscopic visual inspection of brain tissue.

4.8.10.1.2 Absence of aphasia when left inferior frontal gyrus and surrounding area damaged

Cases of brains, damaged in the left inferior frontal gyrus and/or its neighbouring areas, but without leading to any manifest aphasia, were relatively rare. Nevertheless, there were some, and they formed a principled objection to Broca's thesis. Tuke discussed a case of a person who had never shown signs of aphasia, but in whose brain the grey matter of the 'left external frontal convolution' was subsequently found to be 'utterly disorganised, - a mere mass of molecular matter, - no nerve-cells'; an identical situation was found in the right hemisphere.(280) Similarly, Palmer quoted a case of a man who had experienced no aphasia, yet in whom 'half of the substance of the left anterior lobe' was found to have been destroyed.(281) Simpson reported a case of a person in whom there had been no speech disturbance at all, yet a 'large depression' was discovered 'across the [left] posterior frontal convolution'.(282) Day had a similar case, except that there was 'complete disorganisation of the left cerebral hemisphere'.(283) Lawrence's case was that of a boy who had suffered a head-injury which had left his speech 'but partially affected'. Nevertheless, no damage could be found later in the 'left frontal convolutions'.(284)

There then followed a gap of ten years before another case was reported in which there had been 'not the least symptom of any defect in the speech of the patient', whilst at the same time 'The third left frontal convolution was almost entirely destroyed, along with two-thirds of the island of Reil'. The only untouched area in the convolution was a 'thin shred at the extreme posterior end'.(285) A different case, not of aphasia but of 'slowness of speech', had

also been found at post-mortem to reveal considerable damage in those areas that by now were regarded, rightly or wrongly, as the expected areas of damage in cases of aphasia: the whole of the insula, parts of the left inferior and middle frontal gyri, parts of the left inferior and middle temporal gyri, and two-thirds of the corpus striatum within the lateral ventricle.(286)

4.8.10.1.3 Aphasia with no damage in the left inferior frontal gyrus

The strongest evidence to counter the claim of the left inferior frontal gyrus being the centre for speech came in the form of forty-five case-reports of aphasia, in which no damage in that gyrus was ascertained. Nevertheless, the sites of the lesions formed no haphazardly arranged set: one sees examples of damage in the fibre tracts between the inferior frontal gyrus and the internal capsule (pyramidal system) and between the same gyrus and the thalamus (extra-pyramidal system). The cases themselves can be divided into four categories: those in which there was no damage to the left inferior frontal gyrus (and possibly to damage elsewhere in addition);(287) those in which there was damage elsewhere in the left hemisphere (see below for further details); thirdly, those in which damage was found in the right hemisphere (see below); and, lastly, those in which damage was found in both hemispheres (see below).

The items in the second category (damage elsewhere in the left hemisphere) can be further divided on the basis of which areas were damaged:

1. Arachnoid and pia: Bateman 1868d:356 [Case 4].

2. Middle cerebral artery: Russell, J. 1870a:155; Jackson, J.H. 1874c:804; Little 1875:176; Benson 1876: 483; Jaccoud 1876:445.

3. Pre-central gyrus: Magnan 1879b:121-122 [Case 4].

4. Insula and 'immediate neighbourhood': Oedmansson 1868:499 [Case 2].

5. Insula, pre-central gyrus, post-central gyrus, lentiform nucleus, thalamus: Jackson, J.H. 1864c:805.

6. Corpus striatum: Bristowe 1872:24-25.

7. Caudate nucleus: Mickle 1874:258.

8. Corpus striatum, thalamus: Wilson 1876a:81 (see also Broadbent, W.H. 1876 and Wilson 1876b).

9. Corpus striatum, thalamus, lateral ventricle: Moore, W.D. 1868:558.

10. Corpus striatum, thalamus, middle cerebral artery, pons (together with 'general softening'): Benson 1876:483.

The third category (damage in the right hemisphere) contains fewer specified areas:

1. 'angle of Sylvian and longitudinal fissures': Palmer, W.J. 1866:177 [Case 1].

2. Corpus striatum, thalamus: Bateman 1868d:363 [Case 7].

3. 'clot in right hemisphere': Gairdner 1866:393.

4. Pons: Weber 1877:13.

5. In two further cases, it was presumed by the clinicians that the source of the damage was located at (a) 'the right hemisphere' because the patient experienced 'pain on the right side' - presumably of his head (Martin 1873:299); and (b) 'in or near the corpus striatum' (Russell, J. 1874:36).

The fourth category (damage in both hemispheres) is, like the previous three, noticeable for the examples it contains of damage in the basal ganglia and corpora striata:

1.	'general flattening':	Wadham 1869:247.
2.	'flattening', corpora striata:	Savage 1878:529.
3.	'lesions in left and right hemispheres':	Billod 1878:145.
4.	'central parts of both hemispheres':	Bateman 1867:420 [Case 1].
5.	left superior and middle frontal gyri, corpus striatum, thalamus: right corpus striatum:	Dunn 1869:101.
6.	left insula: right 'part of the corpus striatum':	Maradon de Montyel 1879:666.

The most obvious conclusion from the above data must surely be that, even if one allows the linguistic symptoms in each case to be regarded as those of aphasia (à la Trousseau) and not specifically aphemia (à la Broca), no clear correlation can be established between the left inferior frontal gyrus and "language" (in the widest sense of the word). To imagine, as some clinicians did, that Broca was de facto correct in his conclusions was simply to fly in the face of a large body of informed opinion. On the other hand, if Bateman's view of the nature of neurological damage in aphasia were true, then a more thorough examination of the brains in the individual cases might have revealed some form of lesion in the left inferior frontal gyrus. The irony (almost the tragedy) of so much of the work that was done within the field of neurolinguistics was that only a few

clinicians paused to consider whether brain-damage had, by definition, to be countenanced solely in terms of observably diseased tissue.

4.8.10.2 Generalizations

A separate form of criticism of Broca's views appeared not in the form of any one individual case-study, but as a generalization. There were a number of works in which the authors, normally without adducing any specific evidence, pronounced their opinion on Broca's hypothesis; these appeared in print fairly constantly between 1866 and 1887. The actual form of the criticism varied. Some authors maintained that the 'faculty of language' was not in the left inferior frontal gyrus, but elsewhere - either in the left hemisphere or in both of the hemispheres. Others adopted a decidedly more philosophical approach, and objected to Broca's conclusions on metaphysical grounds: for example, that there could be no such concept as a single faculty of language: either one should be seeking the neurological correlates of a set of 'faculties' or else a less specifically arranged pattern of cells within the cerebrum.

The first generalization against Broca's point of view appeared in 1866 - considerably later than an equivalent objection in France. In a review of Ladame (1865), the reviewer pointed out that Ladame 'utterly disbelieves in the localisation of the seat of language in the frontal convolutions ... and believes instead that it is much more common when the lesion was situated in the corpus striatum or the optic thalamus'.(288) Similarly, the reviewer of Trousseau's Lectures on Clinical Medicine (1866) noted that the work 'discusses cases, which do not coincide with the doctrine that the faculty of speech has its seat in the left frontal convolutions'.(289)

It was to be another two years, however, before what might well be construed as 'organised' objections to Broca's views were heard in the British Isles. At three meetings of the Medical Society of London, between November 1868 and February 1869, three clinicians, Maudsley, Bateman and Day made their views known, in fairly strong and uncompromising terms. Maudsley was the most trenchant: 'Broca's theory is inadmissible a priori, as well as inconclusive a posteriori; it is entirely at variance with the knowledge which we have of the physiology of language, and it is really not supported by the pathological evidence on which it has been based'.(290) He further pointed out that since Broca advanced his theory on the basis of examining the brains of two former inmates of lunatic asylums, one might equally well say that sanity was located in the left inferior frontal gyrus!(291) A few months later he was followed by Bateman, who stated that 'of all the different theories advanced, this, least of all, will stand the test of an impartial scrutiny'.(292) Day put his case very laconically: 'speech is not located in Broca's convolution'.(293) (He quoted no cases in support of this view, but he may have had in mind a case he discussed at the actual meeting at which he had made this pronouncement, of a man who showed no signs of any aphasia, yet in whom 'complete disorganisation of the left cerebral hemisphere was found'.)

As far as one can tell, the effect of these three opinions, expressed within a fairly short time of one another, was negligible: other clinicians continued to quote Broca's view as authoritative and to provide evidence in favour of it.(294) No further objections to Broca were heard for another two years.

Between 1871 and 1887 one sees the emergence of two clearly defined types of criticism of Broca's position. There were those clinicians who argued (or in most cases simply stated as incontrovertible fact) that an area of the brain, other than the left inferior frontal gyrus, was the proper 'speech' area; and there were others who based their objections on more theoretical grounds. Thus, Thomas Watson argued against Broca on the two criteria that have been discussed earlier: that cases of aphasia were known to have existed in which no damage to the left inferior frontal gyrus had been found; and, secondly, there were known to have been cases of damage in that particular gyrus which had been unaccompanied by aphasia.(295)

A different type of objection was that both hemispheres of the brain were the 'speech-centres'. Dodds singled out the insulae, the lowest parts of the pre-central gyri and the posterior parts of the inferior frontal gyri (in both hemispheres).(296) For Bristowe, on the other hand, the objection to Broca was that it was not the inferior frontal gyrus in either or both hemispheres, but probably the corpus striatum that was the true location of the 'faculté du langage articulé'.(297) (Meynert, incidentally, whose views were published in English as well as in German, pin-pointed a more lateral structure, the claustrum, as the location.)(298) A topographically similar location favoured by Ladd was the insula in conjunction with the inferior frontal gyrus - a possibility that Broca himself had at one time considered.(299)

There were other clinicians, however, who felt that to pursue the search for the pathological correlates of the 'faculty of language' or 'the speech centre' was misguided. Various comments were expressed

to the effect that not one, but several centres in the same hemisphere should be sought.(300)

Objections of a philosophical kind were fewer but did not lack anything for that. It was the view of Jaccoud and Brown-Séquard (both Continental clinicians; in the latter's case, at least by training), that the very idea of a faculty of language was untenable. Jaccoud stated that 'acts of ideation and translation of the idea into words have no defined physiological centre'.(301) Brown-Séquard, whilst agreeing in principle with the concept of multiple faculties of language, maintained that they 'exist not clustered together in contiguous cells, but scattered'.(302) One clinician, however, ruled out any possibility of correlating linguistic behaviour and neural functioning.(303) Another wanted to see a rather different approach to the question: what he called a 'physical' rather than a 'mental or spiritual approach'.(304) The precise implications of this statement are uncertain, but the drift of it would seem to be the wish for a more intensive examination of the anatomical data at the expense of the psycholinguistic hypotheses.

To any disinterested observer of the neurolinguistic scene it it must have seemed obvious, as year after year of research went by that, firstly, much more than the left inferior frontal gyrus appeared to participate in speech production, and, secondly, that considerable doubt existed about the very adequacy of the hypothesis that had formed the basis of so much of the work over the years. Indeed, it might well have been asked if the entire quest for the neural correlates of "language" was not, in essence, spurious, and that a

wider, more sophisticated and more elaborate framework was required in order to tackle the question in future. Some of the features in a revised approach to the study of neurolinguistics are discussed below.(305)

4.8.11 A wider perspective for the study of brain-language correlates

4.8.11.1 Anatomical asymmetries between hemispheres

Some clinicians raised the question of why language should be located, as it appeared to be, in the majority of cases, in the left hemisphere.(306) It was considered that the observable asymmetry of the hemispheres, either in terms of size or weight or both, might have some relevance. A close and detailed examination (by a committee of doctors) of one particular aphasic's brain revealed that the left hemisphere was smaller than the right: was this in any way directly related to the aphasia? Could it, for example, have established a condition in which the patient had a pre-disposition to aphasia, or was the asymmetry immaterial?(307) No definitive answer was forthcoming, but at least the topic had been broached.

4.8.11.2 Arterial blood-flow and the importance of the left middle cerebral artery

It was Hughlings Jackson who was the first to point out that the key to the localization of the aphasic lesions lay not in the actual cortical tissue but in the geography of the arterial system that provides the nutrition to the tissue. He emphasized time and again the complete relevance of the course of the middle cerebral artery (in itself the largest of the arteries branching off the internal carotid) for an appreciation of why the topographical distribution

of the lesions in aphasia might differ from case to case.(308) His views were regarded within a short time as providing the answer to one of the problems of aphasia, namely the lack of any single circumscribed area of the brain as the apparent source of the damage. His analysis was accepted by very many clinicians in Britain.(309)

4.8.11.3 Broca's thesis within a wider perspective

Whilst some clinicians did not agree with Broca's narrow hypothesis, they felt that his case should not be thrown out altogether. For example, Alexander Robertson believed that the inferior frontal gyrus did play a part in speech production, but only as the 'conducting and coordinating media'.(310) And Bateman, ever an indefatigable critic of Broca, was equally of the opinion that this gyrus was involved on the grounds that it received 'fibres of a greater variety of sources than any other convolution'.(311)

What in a sense was a lost opportunity in studies on neuro-linguistic correlations was that the various and different opinions respecting the neuroanatomical substrata of speech (and other modalities) were never developed, dispassionately and objectively, into a wider perspective. Too much time and effort was spent on either supporting or opposing Broca, and not enough on extracting the potential, if not the actual, features from his ideas that, when taken in conjunction with the results of other investigations (for example, on the microstructure of the intra-cerebral tracts involving the inferior frontal gyrus) might have led in time to the setting-up of a more extensive, and better integrated, concept of the neural activities that underlie language processing.

In this connection, it should not be forgotten that the intracerebral tracts used in the production of speech had been hardly investigated at this time. Kussmaul summarized the state of knowledge as follows.

(1) Complete ignorance existed about the course of the fibres of the hypoglossal nerve in the hemispheres.

(2) Only a very limited amount was known of the 'exact course followed by the motor fibres subservient to articulation, on their long journey from the frontal cortex to the basal phonic centre, or about their connection with the central masses of gray matter' and of the 'place where those motor fibres of the corona radiata which are subservient to speech enter the cortical convolutions'.

(3) Uncertainty existed as well about the possible involvment of the thalamus in speech production and of the grey matter of the cerebral peduncles.

(4) Slightly more confidently, however, it was believed that the corpus striatum participated in the 'mechanism of literal phonation and the articulation of syllables'.

(5) All that was known with complete certainty about the actual neurophysiology of speech was that the corpora quadrigemina played no part, that the left corpus striatum played some part, on the grounds that a greater degree of impairment of speech could be caused by damage in the left rather than the right corpus striatum, that the 'main current of the centrifugal impulses of speech' passed through the left hemisphere,

> and that damage to the white matter in the neighbourhood of the inferior frontal gyrus could lead, without damage to the gyrus itself, to a 'disturbance of the power of forming words'.

For Kussmaul, the need to 'unravel the tangled paths of feeling, thought, will, and action' was one of the priorities of future neurolinguistic research.(312)

In the following years, much time and effort was to be devoted to discovering the finer anatomical structure of the cerebrum.(312a) Occasionally, the investigations were carried out in the context of aphasiological studies. Thus, Brissaud described in detail the microstructure of the internal capsule in relation to the inferior frontal gyrus.(313)

4.9 Models of language processing

4.9.1 Introduction

Compared with the period 1793-1862 in which a relatively small amount was published on the psychological and physiological mechanisms of speech production, the years 1864-1894 witnessed a very considerable growth of interest in the subject. The only work that will be considered here from the period up until 1871 will be that of British clinicians. After that date, Continental as well as British work will be taken into account, as some of it was summarized in Kussmaul's Disorders of Speech (1878). (It was as a result of the publication of Kussmaul's work that information on German models of language processing, in particular the ideas of Baginsky, Wernicke and Spamer,

became available to British readers, albeit in a somewhat truncated form.)[314]

4.9.2 Terminology

In any discussion of how speech is produced, it is easy to slip into the current jargon of speech modelling, of 'decoding mechanisms', 'neuromuscular encoding', etc. This temptation has been resisted here, as there is a danger of imputing to 19th century work certain ideas which, strictly speaking, were not part of the authors' intentions. Instead, the following discussion will proceed on the basis of answering the central question that confronted 19th century researchers: what happens in the brain prior to the innervation of the muscles used in speaking? A further question, the location in the brain of the individual components in a model, will be dealt with, in part, in the discussion of Bastian.[315]

4.9.3 Origins of the theoretical constructs

The description and/or discussion of language processing was based to some extent on concepts and terminology deriving from earlier 19th century psychology and physiology. As work progressed, however, newer ideas and terminology, some of it from the literatures of experimental and physiological psychology, came into fashion. Thus, alongside 'older' phrases such as 'ideas are put into the form of speech' and 'the memory of words', one finds expressions such as 'perceptive centres', 'associated motor intuition', 'cheiro-kin-aesthetic impressions', 'imitative impulse'. To what extent such comparative innovations clarified such a complex area of investigation as language processing will be discussed below. One should not

forget, moreover, that a further reason for the growth of interest in these models was that, form the 1870s onwards, considerable progress was made in the field of cortical mapping as a result of experimental studies of animal brains. The work of men like David Ferrier in the British Isles and Fritsch and Hitzig in Germany was to extend, indirectly, even further the horizons of neurolinguistic investigations and speculations.(316) Nevertheless, the real impetus for the study of language models was the need that was felt by some clinicians to achieve a seemingly rational and all-embracing explanation of a wide range of aphasic defects.(317) How might one explain, for example, an aphasic's ability to write to dictation but not spontaneously, or his ability to start a sentence voluntarily and correctly, only for it to degenerate quickly into an incoherent string of sounds? The answer lay, it was believed, in uncovering the very psychological mechanisms that operated during the course of speech production and the other linguistic modalities.

The basic raw-material from which the models were formulated was, as pointed out above, certain concepts in psychology and physiology. One might add, however, that since no author actually refers to any work on psychology or physiology (either by way of acknowledgement or otherwise), it is quite possible that some of the ideas being used in the models were the result of the authors simply using terminology they were familiar with, without necessarily considering all of its theoretical ramifications.

4.9.4 British work from 1867 to 1871

4.9.4.1 General

A very characteristic feature of British work, at least prior to the second half of 1867, was the way in which the process of speech

production was described in terms of a series of generalities. Even after Broca's work became known, with its concept of individual 'faculties', British clinicians continued to describe speech production in fairly broad terms. Thus, Jackson wrote of how ideas were provided by the 'Mind'. These were then given linguistic form by 'Memory', and then the movements of the articulators produced the 'recognised sounds'.(318) In this, he was following a tradition from earlier in the century, where the emphasis was on delineating the broad charateristics of the speech production rather than trying to specify any actual stages in greater detail: such a development was to come later, both in British and Continental work.

A decided change became noticeable in the discussions of speech production from the summer of 1867 onwards. The term 'centre' and with it the very idea of a specific and potentially determinable step in a psychological model of speech production came into use. The term itself has so often been associated with the name of H.C. Bastian; but he was not the first to use it. The honour goes, equally, to the Glaswegian physician Alexander Robertson and the Cork physician John Popham, who both used it at approximately the same time in connection with descriptions of speech production.(319)

The terminology of 'centres', together with that of the more recent type of psychological theory, soon caught on. In 1868, Maudsley, for example, was discussing speech production in terms of 'ideation', 'motor centres of speech', 'associate motor intuition', etc.(320) Then, in 1869, Bastian extended the concept of the 'centre': it became a 'perceptive centre'. He established several of these for

explaining the intricacies of language processing; these are dealt with in the following sub-section.

4.9.4.2 Bastian's 'perceptive centres' (1869-1898)

Bastian first used the term 'perceptive centre' in a paper on the physiology of thinking, published in January 1869.(321) He argued that 'auditory impressions were located in 'perceptive centres' in both cerebral hemispheres. Since, in his opinion, words were the essence of the thinking process, then the very nature of thought must involve these 'auditory impressions' (or 'sound impressions') in the perceptive centres of the cerebral hemispheres.(322) (To avoid any misunderstanding, it should be noted that Bastian was using 'auditory impression' in the sense of Saussure's 'signifiant' of the linguistic sign; it was not being used in the sense of the impression made on some part or parts of the mechanism of speech-comprehension by incoming nerve impulses from the cochlea.) Furthermore, he said, these 'auditory impressions' do not exist in a single centre of the brain, but are distributed over several centres, all interconnected; but he admitted ignorance at this point of where they were.(323) He made no comment too on why there should be several of them. As will become clear from the discussion of the models that were proposed during the 1870s, he was almost alone in imagining that more than one centre existed for the storage of 'auditory impressions'. He did, however, believe that these 'auditory perceptive centres' fed information forward into the corpora striata of both hemispheres, and thence to the medulla.(324)

One notes an apparently important change in his views shortly afterwards. Whereas previously the perceptive centres had been concerned with 'auditory impressions', now (1869c) they were said to be 'chiefly concerned with the phenomena of Intellect, Emotion and Volition'.(325) This major extension of the function of perceptive centres in no way affects, however, his basic argument that they perform a critical function in speech production.

There is then effectively almost a twenty year gap between these three papers of 1869 and his next major contribution to the theory of language processing.(326) In a major development of his ideas, presented at the BMA meeting in Dublin in August 1887, the term 'perceptive centres' was never mentioned. In its place one finds 'word-centres' or 'memories'. Bastian argues that words exist not as single items in the brain but in the form of what he calls 'multiple memory'. That is, a word is, in neurophysiological terms, the interlinking of cell-groups in different areas of the cortex. These constitute the four varieties of 'verbal memory': auditory, visual, glosso-kinaesthetic and cheiro-kinaesthetic.(327)

In comparison with the views he held in the late 1860s, one sees two important developments in his thinking. Firstly, words exist in more than simply 'auditory' terms, and, secondly, the 'auditory impressions' are now located in a single centre, rather than being distributed, as previously, over several centres. However, in contradiction to this, he argues that during speech-production words are revived in the auditory and (if necessary) the visual centre. In other words, the auditory 'word-centre' is still the primary

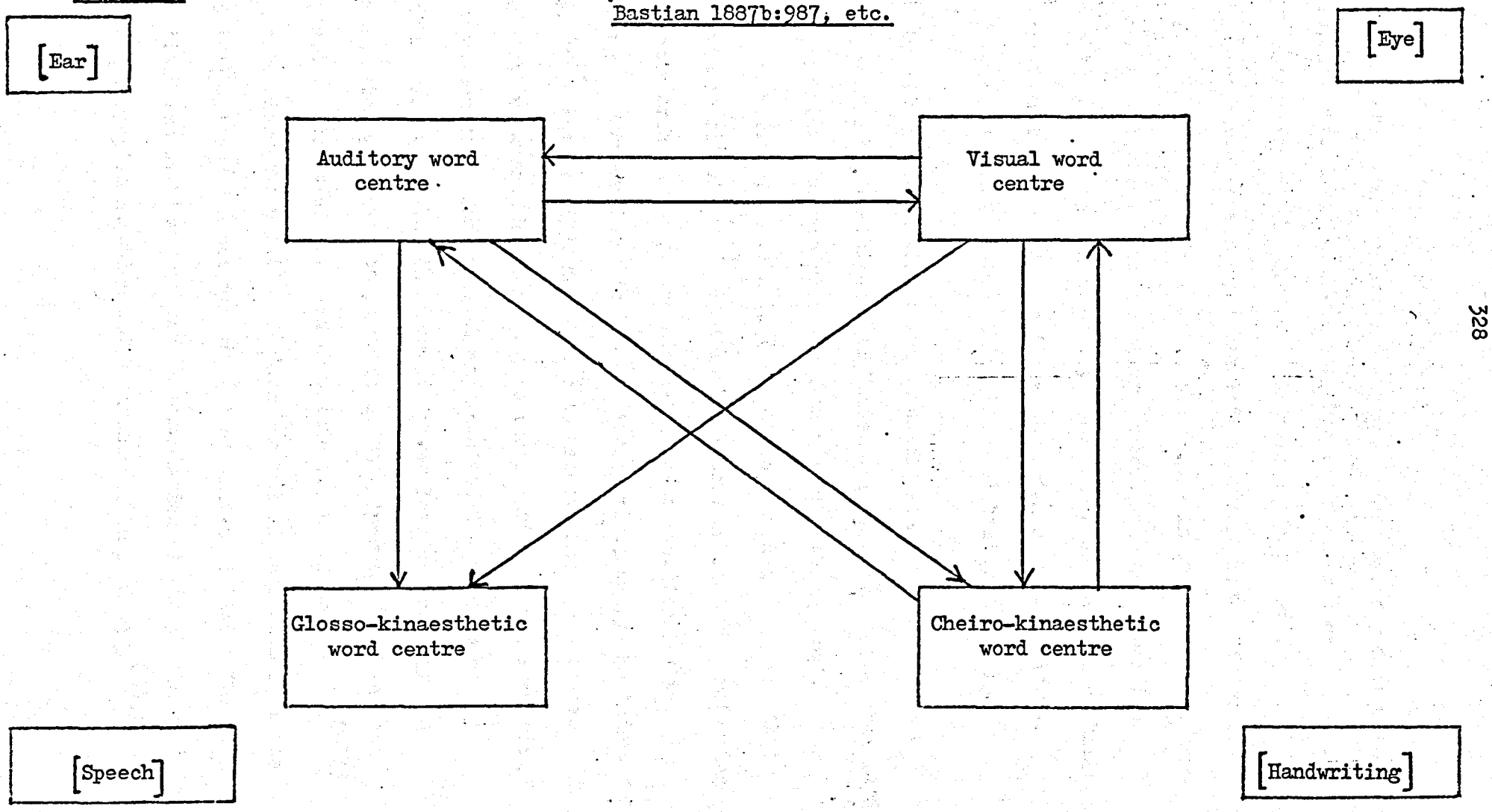
source of words. The glosso-kinaesthetic centre is then activated (i.e. the pattern for the same word is registered), followed by the 'motor centres in the medulla'.

In actual fact, the scale of development of his ideas, as distinct from the different terminology, is minimal. Words are still, primarily, located in the auditory word-centre; but to take account of orthographic as well as spoken words, visual and handwriting factors have to be included in the model. A diagram showing the relationship of the four word-centres to each other is produced (see Figure 12), and some details are given of the location of the different centres. The glosso-kinaesthetic word-centre is said to be in Broca's region;(328) the cheiro-kinaesthetic centre is located (tentatively) above Broca's region.(329) The auditory and visual centres are both in the occipital lobe. Lines of communication link the centres with one another, except that the glosso-kinaesthetic and cheiro-kinaesthetic centres remain unconnected.(330)

Whatever the merits of this view of words as sets of interlinking cell-groups in different parts of the cortex, Bastian's reputation in neurolinguistic circles suffered a severe setback in 1896, on account of the post-mortem findings in one of his patients. Head has described how, in the case of an aphasic who had been demonstrated by Bastian to students at University College Hospital, London, for the previous 18 years, 'the post-mortem examination revealed unexpectedly profound changes'.(331) In March 1896, Thomas Andrews died. He had been presented in life as a classic example of an aphasic who exhibited symptoms that could be accurately localized. He was, then, for Bastian,

Figure 12

Bastian 1887b:987, etc.



the epitome of the theory of word-centres. What was found at post-mortem, however, demolished entirely Bastian's concept of the cerebral localization of the centres. Andrews had suffered from a severe expressive aphasia: yet his left inferior frontal gyrus had been left unscathed. Furthermore, the damage in the left hemisphere had been so extensive that the other centres and the connections between them had been gouged out: yet the man's communicative abilities were considerably greater than the post-mortem evidence allowed! (See reproduction of photograph of Andrews' brain, Figure 13.)

Bastian remained silent for an entire six months, then at a meeting of the Medico-Chirurgical Society, in London, in November 1896, he admitted that 'severe problems attach to the theory now'. He continued, however, to talk in terms of four word-centres and their 'approximate sites'.(332) Some months later, he was still referring to Broca's area as the glosso-kinaesthetic centre, despite the alarming counter-evidence to his own theory provided by the Andrews' case.(333) But by 1899, he had had to accept that a considerably more cautious approach was needed to the question of the location of the word-centres. The cortical map remained the same as before (that is, in 1897), but the commentary was less certain: previous dogmata had given way to pangs of doubt - 'perhaps ... has been supposed ... doubtful ... even uncertain ... seems to be ...'.(334) Head summarized the position Bastian had got himself into in these words: '[Bastian] did not recognize that what he called a "clinical condition" was nothing more than a translation of the phenomena into a priori conceptions, which had no existence in reality'.(335)

Figure 13

DESCRIPTION OF PLATE XV.

On a Case of Amnesia and other Speech Defects of Eighteen Years Duration, with Autopsy (H. Charlton Bastian).

Fig. 2. — Brain of Thomas Andrews before removal of the membranes.

Fig. 3. — Brain of Thomas Andrews after removal of the membranes.

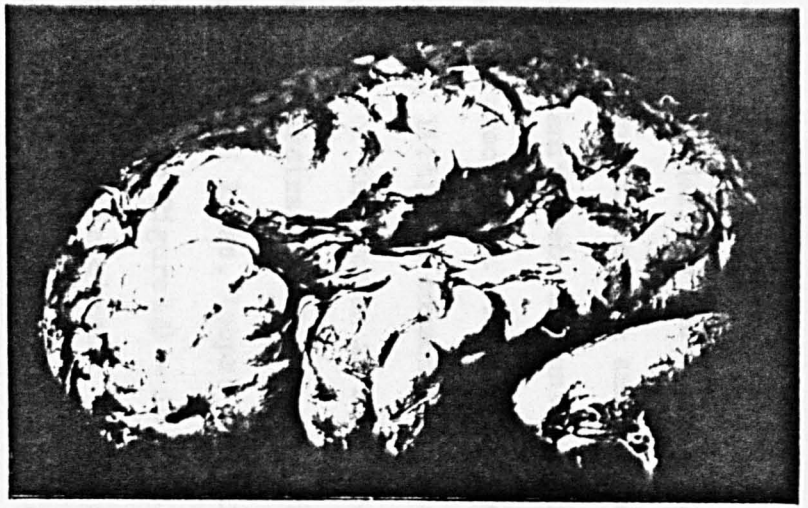


Fig. 2.

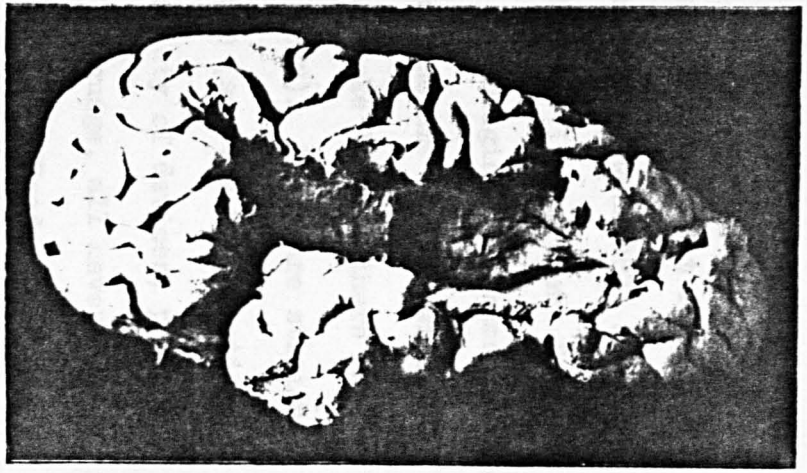


Fig. 3.

4.9.5 Continental and British work, 1871-1893

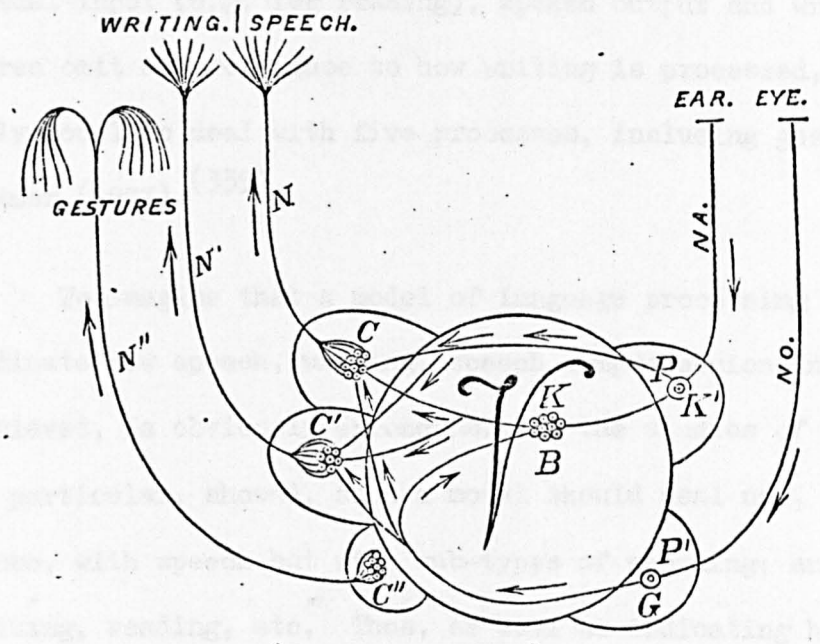
4.9.5.1 Introduction

I consider now the various proposals that were put forward, all in diagrammatic form and with commentary, between 1871 and 1893, to describe (and thereby account for) disturbances in different forms of language processing. An examination of the original diagrams reveals, at first, little in common between them: some are devised with the geography of the cortex in mind (e.g. Wernicke 1874), others on a much more abstract basis (e.g. Kussmaul 1878). There are straight lines, curved lines, loops, embellishments (see the reproduction of Spamer 1877 in Figure 14) - in fact, a variety of devices, perhaps suggesting certain eternal truths about language, all nevertheless expressing that sense of 'serene dogmatism' that Head, for one, found so objectionable.(336) In order to make the comparison of the different diagrams easier, I have reduced them all to the same format: basically, a square or oblong shape with the auditory input on the top left, the visual on the top right, the speech output on the bottom left, and the written output on the bottom right (see Figures 15 - 25). Where, from the commentaries, it is clear that one particular 'box' represents the end-point of the incoming process or the beginning of the outgoing one, this has been placed in approximately the middle of the square/oblong.

4.9.5.2 Prerequisites of models

The term 'language processing' have been used rather than 'speech production' because all of the models attempt to deal with more than speech: 'Language processing' is to be understood, then, in

Figure 14



(Spamer 1877:403)
(See also Figure 17, page 337)

B 'ideas or comprehensions'
C 'centre of co-ordination of speech'
C' 'centre of co-ordination of writing'
C" 'centre of co-ordination of gestures'
G 'sight'
K 'hearing'
K' 'verbal symbol'
N 'motor nerves ... of speech'
N' 'motor nerves ... of writing'
N" 'motor nerves ... of gestures'
NA. 'auditory nerve'
NO. 'optic nerve'
P 'apprehension of hearing'
P' 'apprehension of sight'
V 'paths of the representations'

the sense of the total range of semiotic modalities, both motor and sensory. Most of the models deal with four processes: auditory input, visual input (e.g. for reading), spoken output and written output.(337) Three omit any reference to how writing is processed,(338) and the only model to deal with five processes, including gesture, is Spamer (1877).(339)

To imagine that a model of language processing should simply indicate how speech, writing, speech comprehension and reading are achieved, is obviously erroneous. As the studies of this period, in particular, showed, such a model should deal not, in a general sense, with speech but with sub-types of speaking; and similarly, of writing, reading, etc. Thus, as well as indicating how a meaningful word is produced, it is also necessary to show how a nonsense-word, to which no meaning can be assigned, can be repeated. The authors of the models tended, in general, to focus their attention on a minimum of six aspects of "language": the paths from (i) 'meaning' to 'speech'; (ii) 'meaning' to 'writing'; (iii) 'writing' to 'meaning'; (iv) 'speech' to 'meaning'; (v) the imitation of speech (for example, the parroting of a meaningless word); and (vi) the imitation of writing (both meaningful and meaningless).

This can be looked upon as the minimal list of requirements for the models that were devised. Further, somewhat more complex, types of linguistic activity (for example, reading aloud) were dealt with by some writers, but not, by any means, by all of them.

4.9.5.3 Beyond the auditory input

Taking the line of movement of the auditory input (top left) across the schema as an example, we note that it does not lead to the same box in all the diagrams. There are three possibilities. Firstly, it may move into a central area or areas - central in the sense that it is the end-point of the sensory, incoming chain, or the first stage of the motor, outgoing chain. Secondly, it may by-pass the central area or areas and go directly to the motor output. And thirdly, it may proceed to no central area(s) at all. Examples of all three possibilities are: Baginsky 1871 (Figure 15), Spamer 1877 (Figure 17) - see the line emerging from the underneath of the box labelled 'Apprehension of hearing', and Ross 1886k (Figure 18). If the signal passes to a central area, then it might be to a single centre (for example, Shaw 1893 (Figure 19)),or to a multiple centre (for example, Broadbent 1879,(Figure 20)). One notes, further, that between the auditory input (the first box after the top left labelled 'Ear') and the central area(s) there may be only one intervening stage (for example, Kussmaul 1878, Figure 21), or two (for example, Stewart 1884, Figure 22).

4.9.5.4 The 'central boxes'

The precise nature of the central boxes needs to be considered in more detail, since they cannot be equated with one another in terms of their nature and function, despite their similar position in the models and more importantly, the names that were given to them. For example, Baginsky describes his 'main centre of concept formation' as the point, firstly, at which the memory-centres from all the sensory nerves (in the body or in the central nervous system?) converge,

(Text continues on p. 346)

Figure 15

Baginsky 1871:441

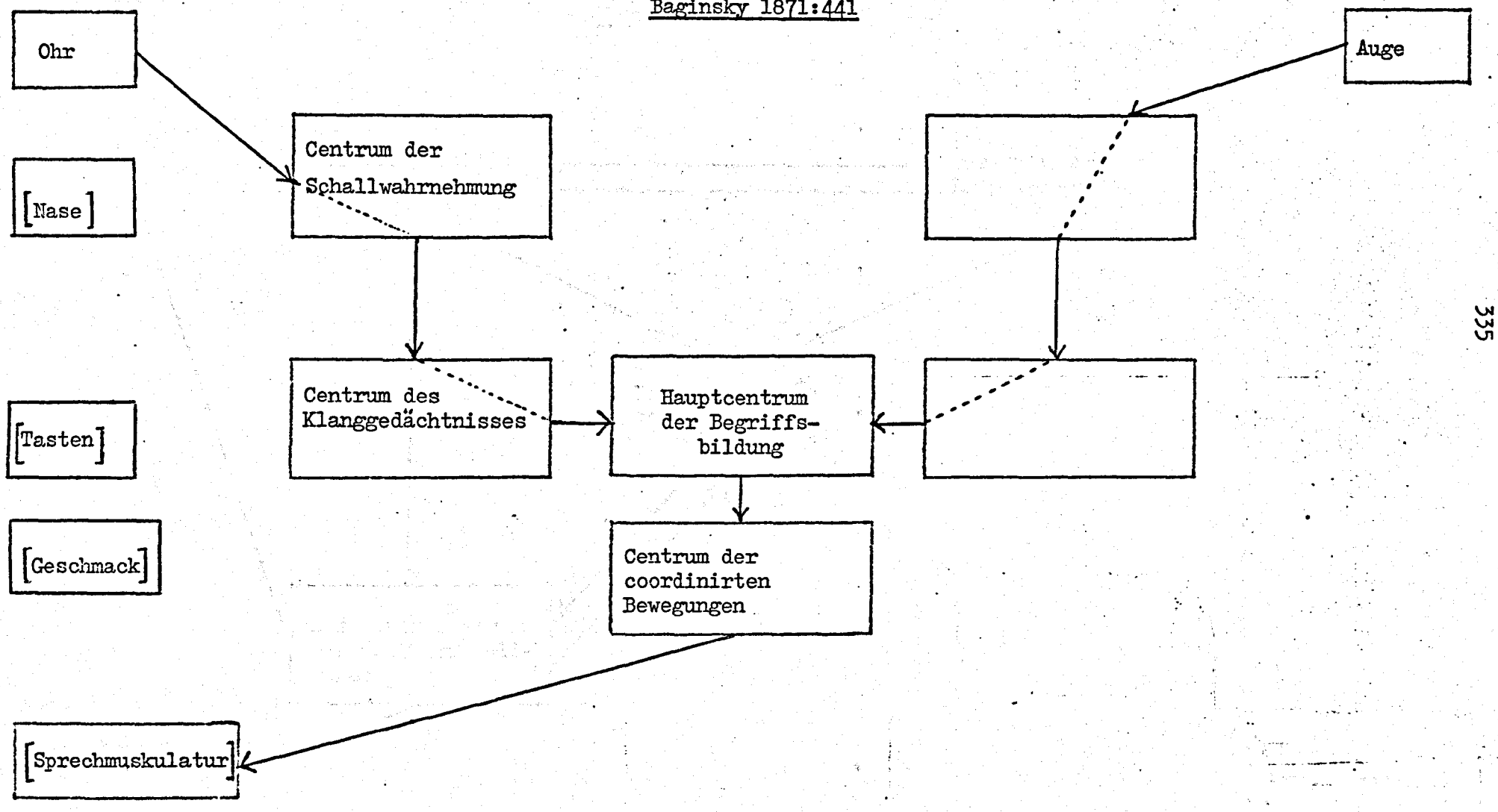


Figure 16

Wernicke 1874:18-19; 23

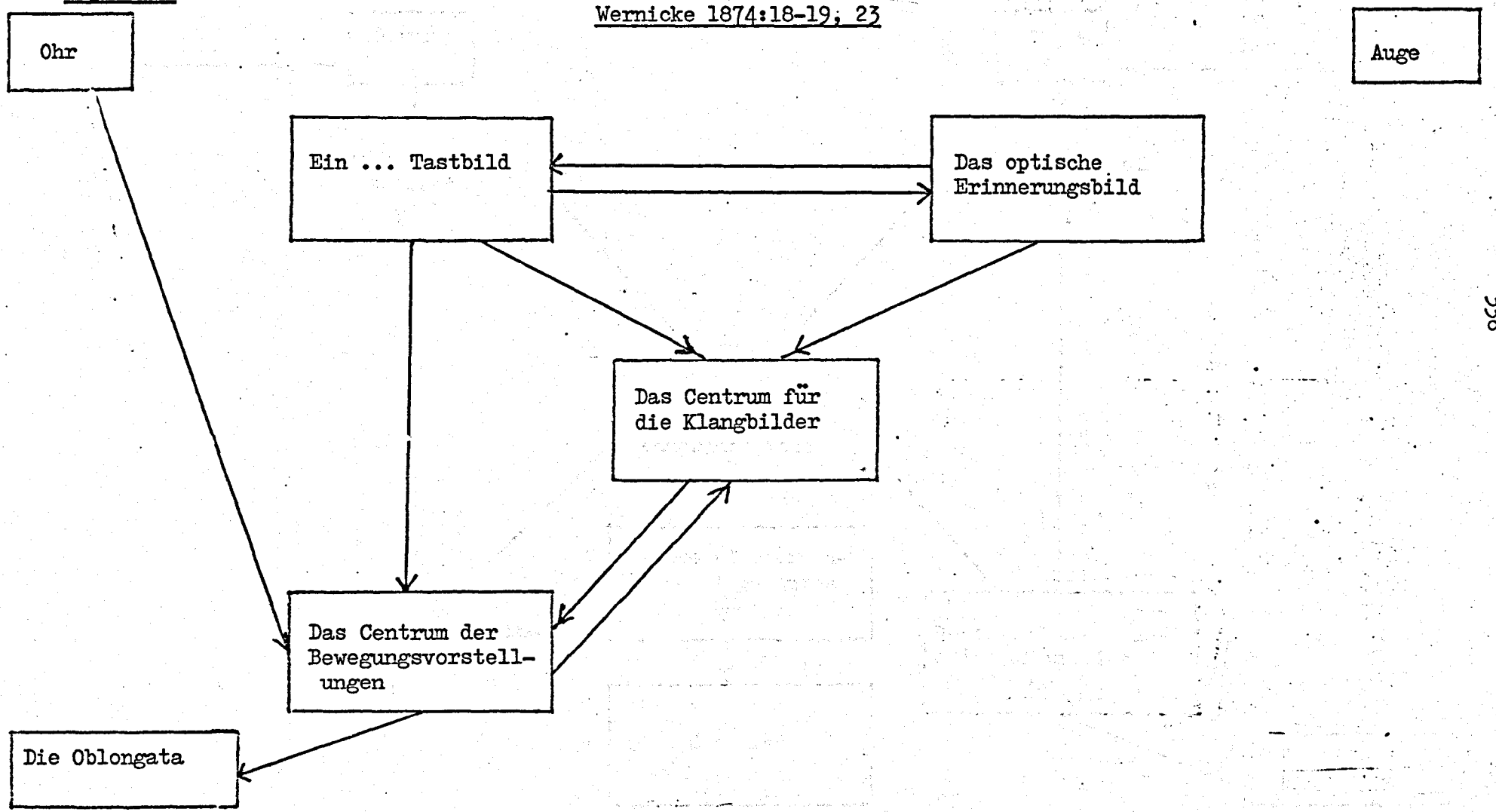


Figure 17

Spamer 1877:403

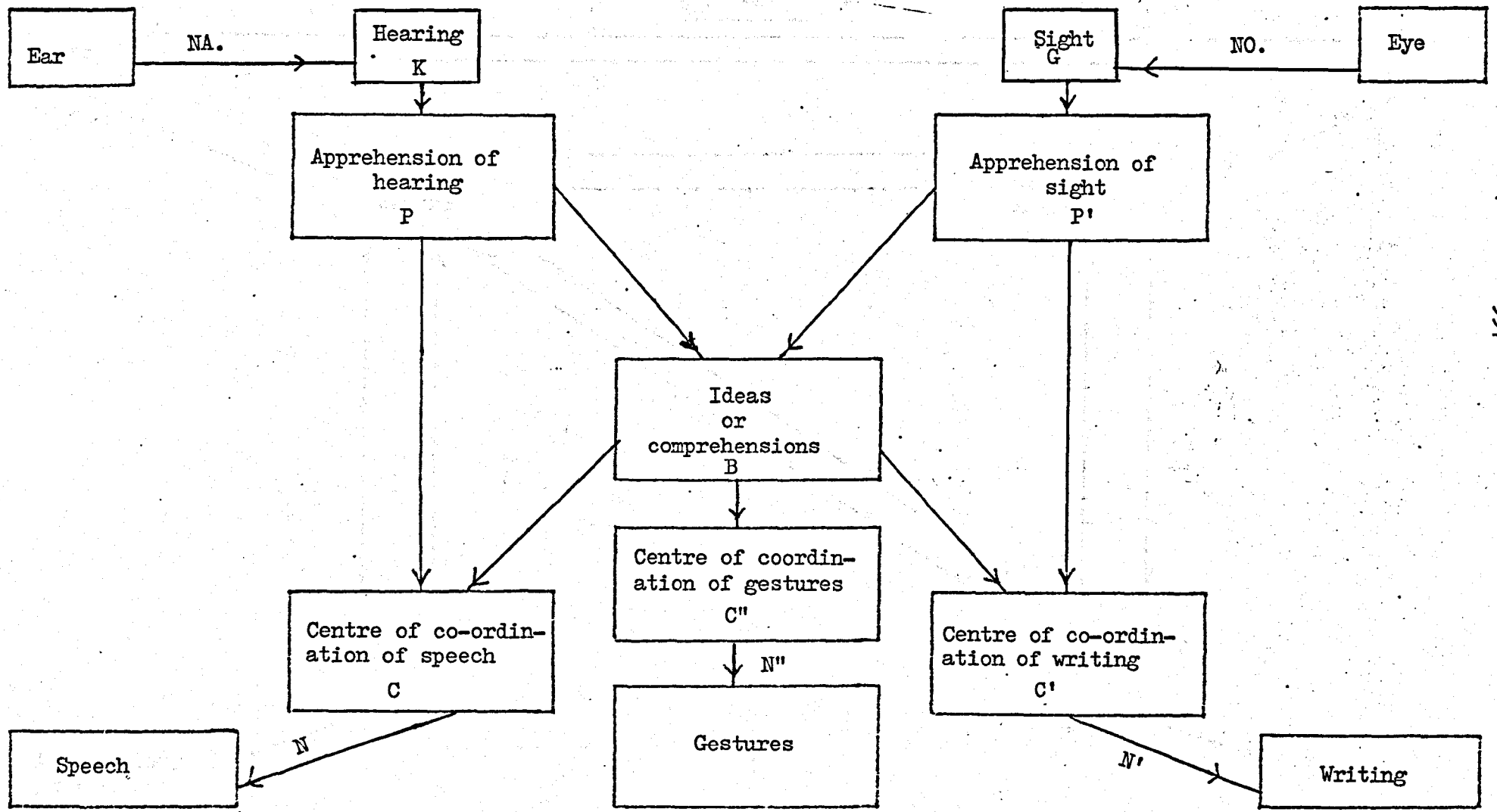


Figure 18

Ross 1886k:107

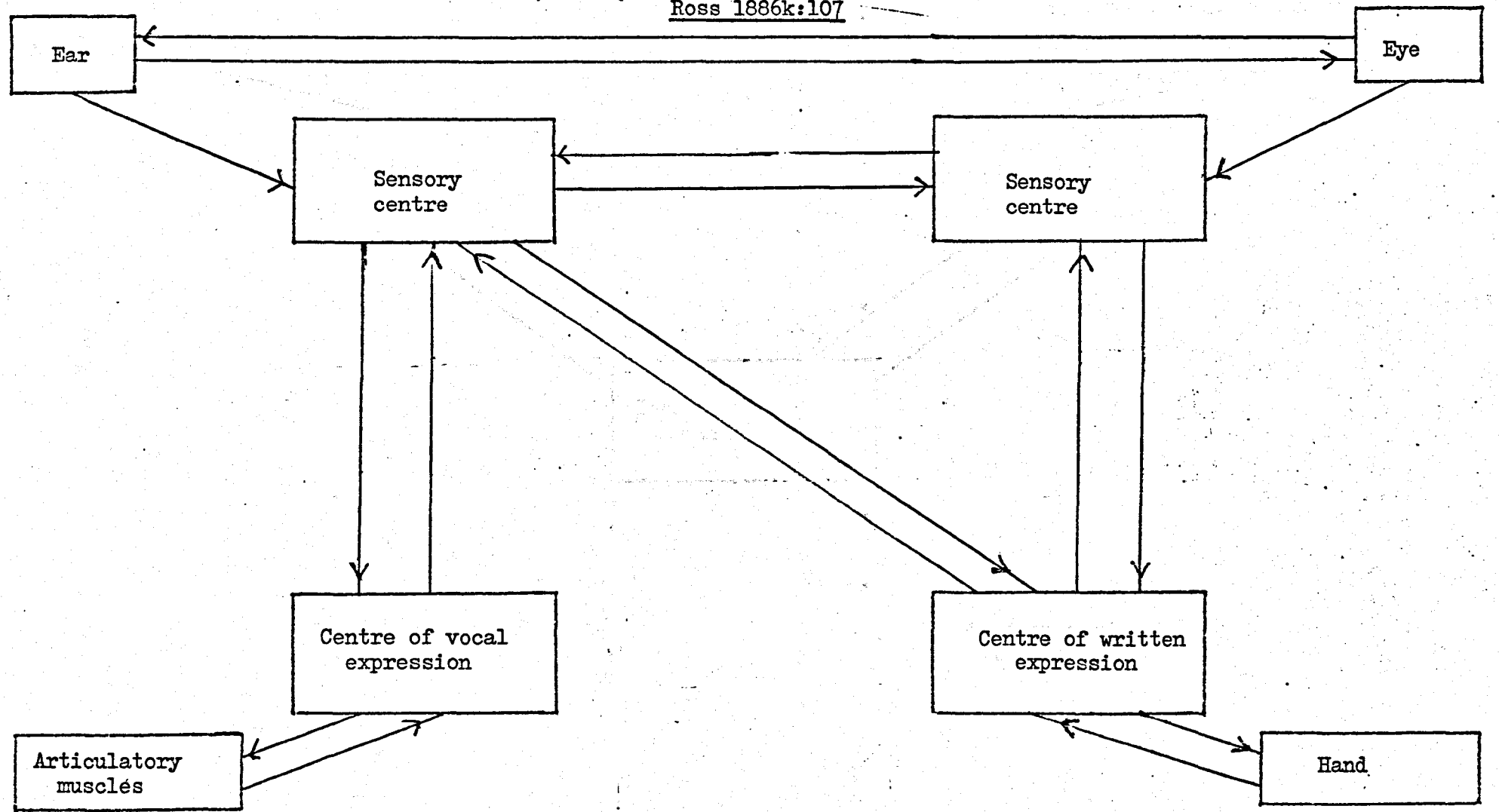


Figure 19

Shaw 1893:512

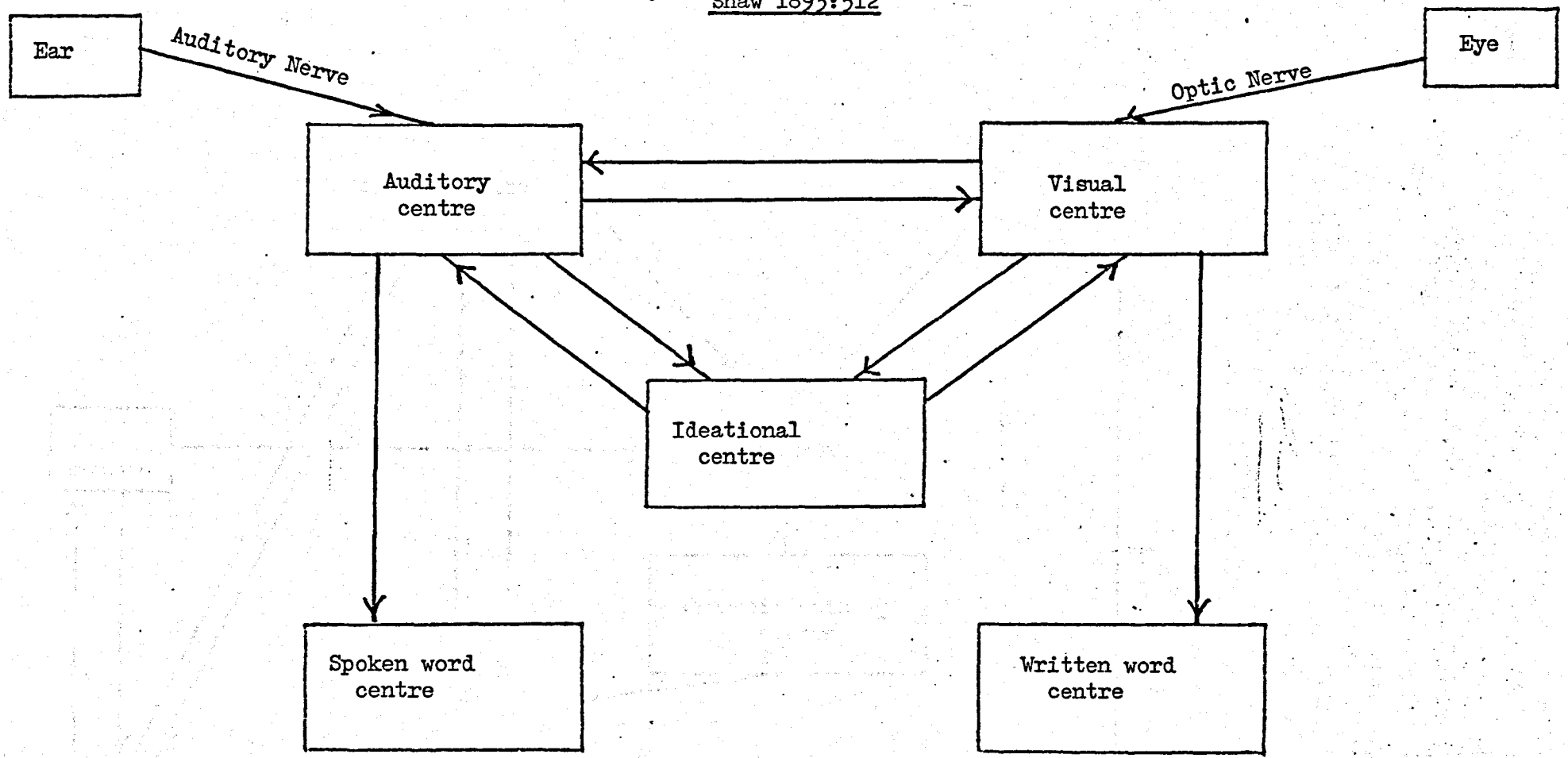


Figure 20

Broadbent 1879:494-495

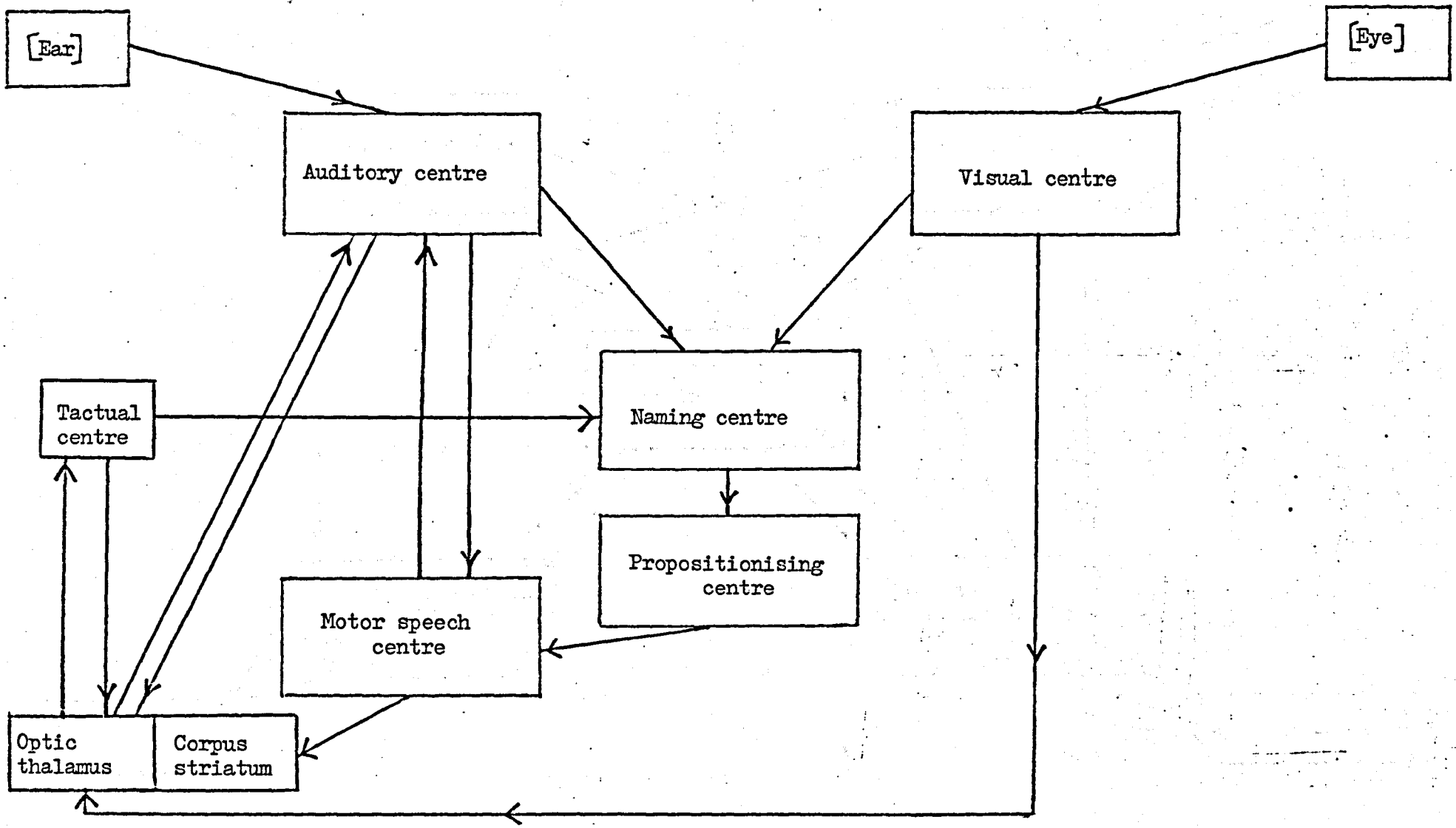


Figure 21

Kussmaul 1878:779

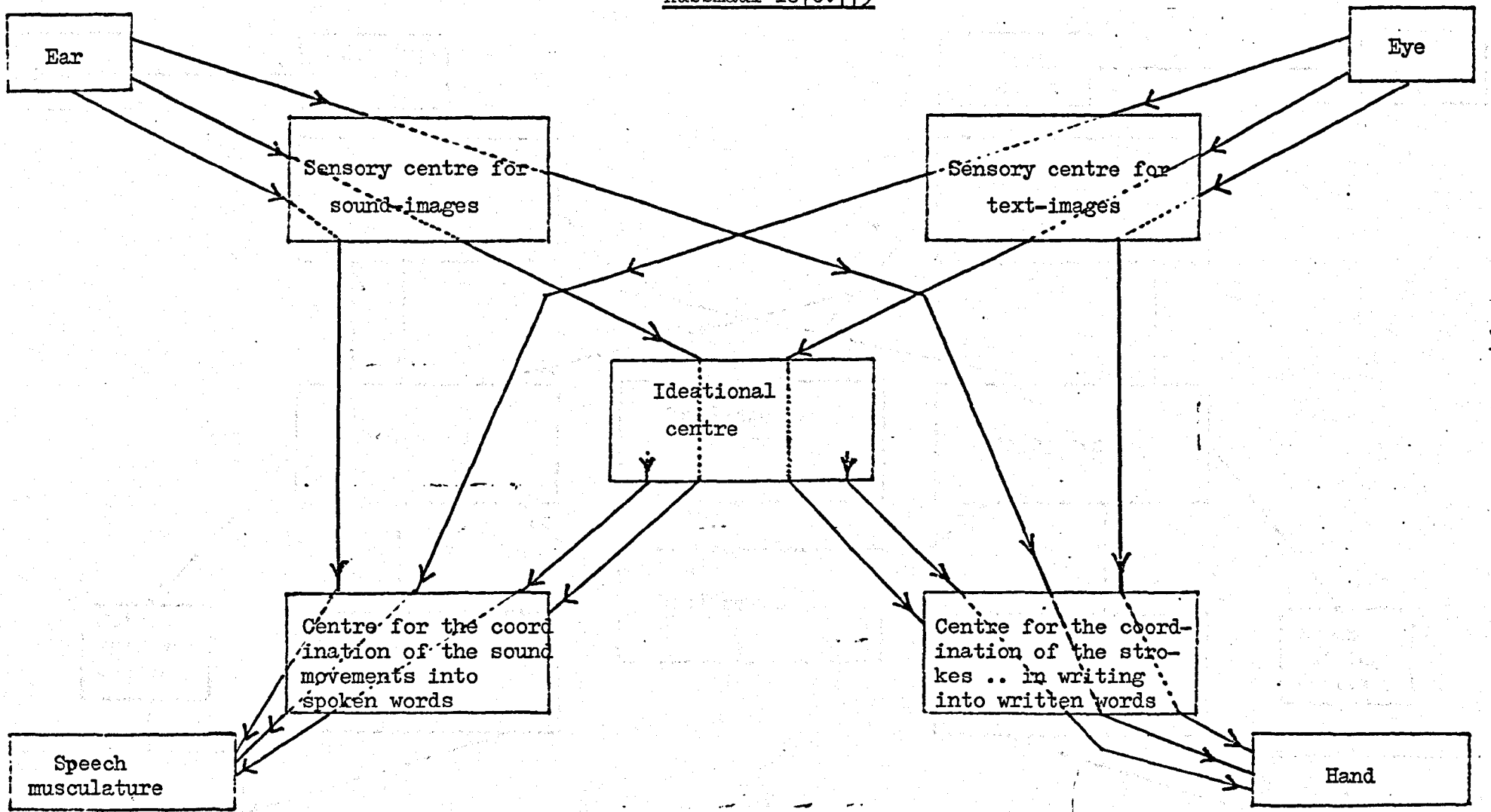


Figure 22

Stewart 1884b:186

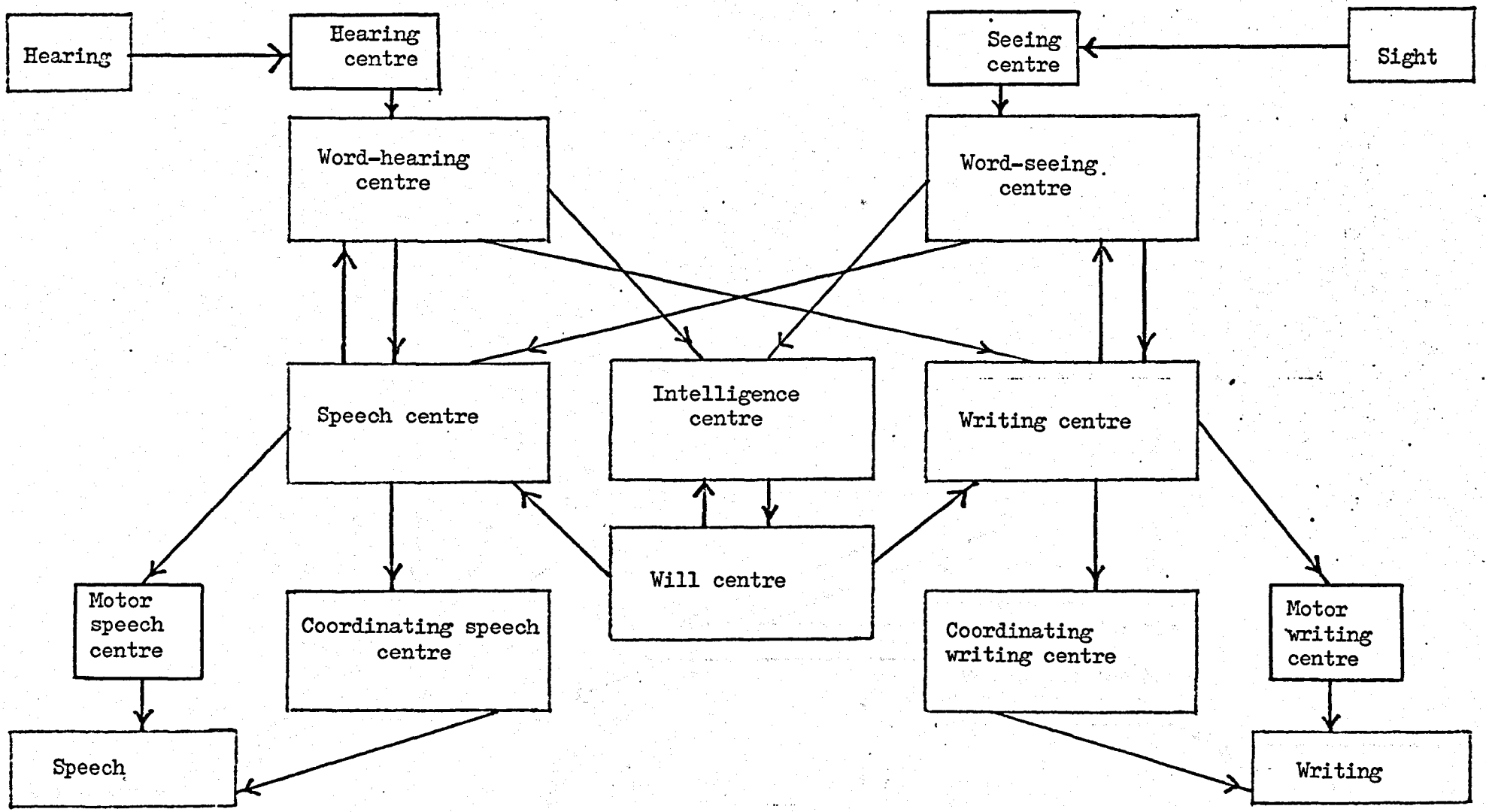


Figure 23

Charcot (1885) after Ross (1886h:360)

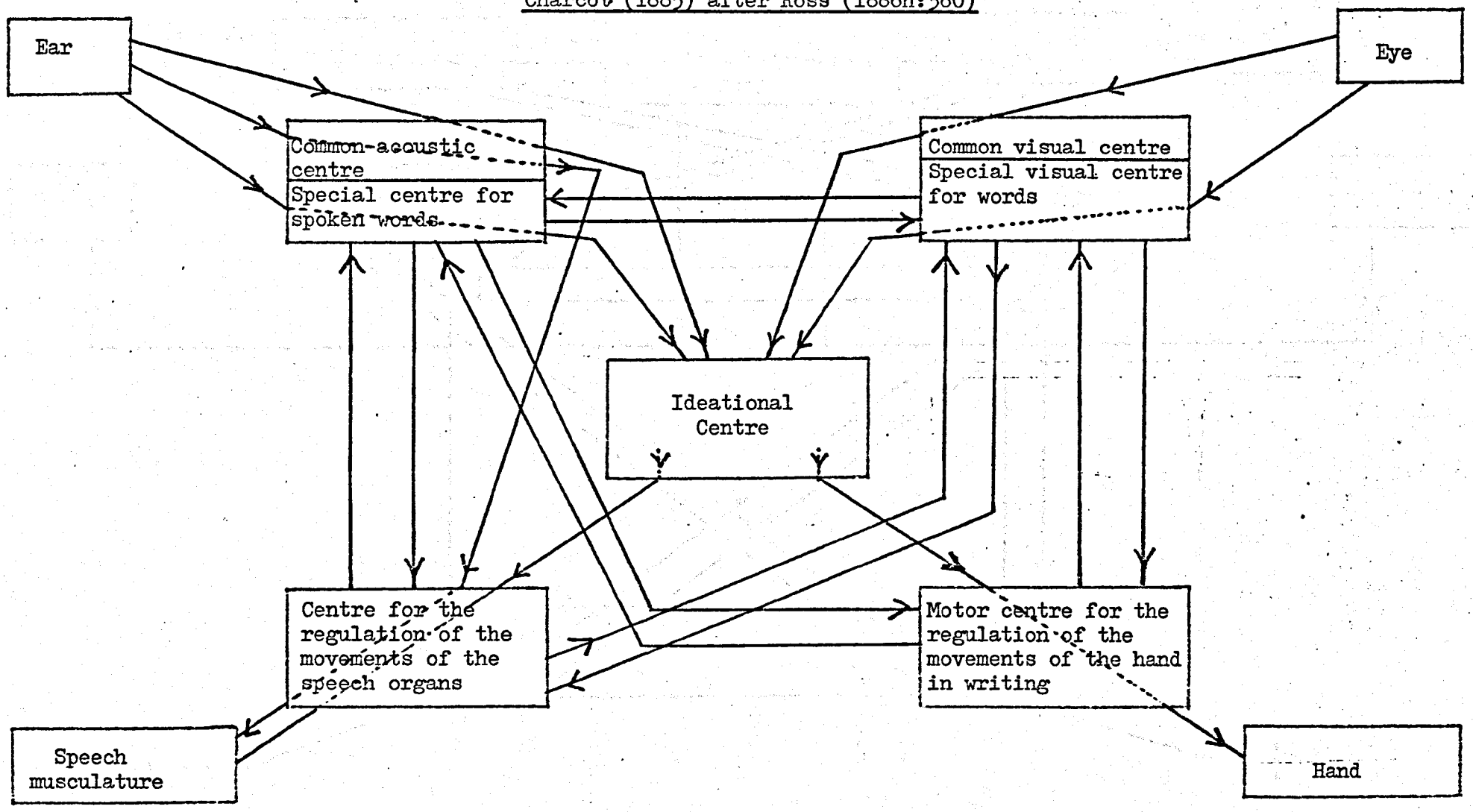


Figure 24

Charcot (modified) after McCosh (1886:202)

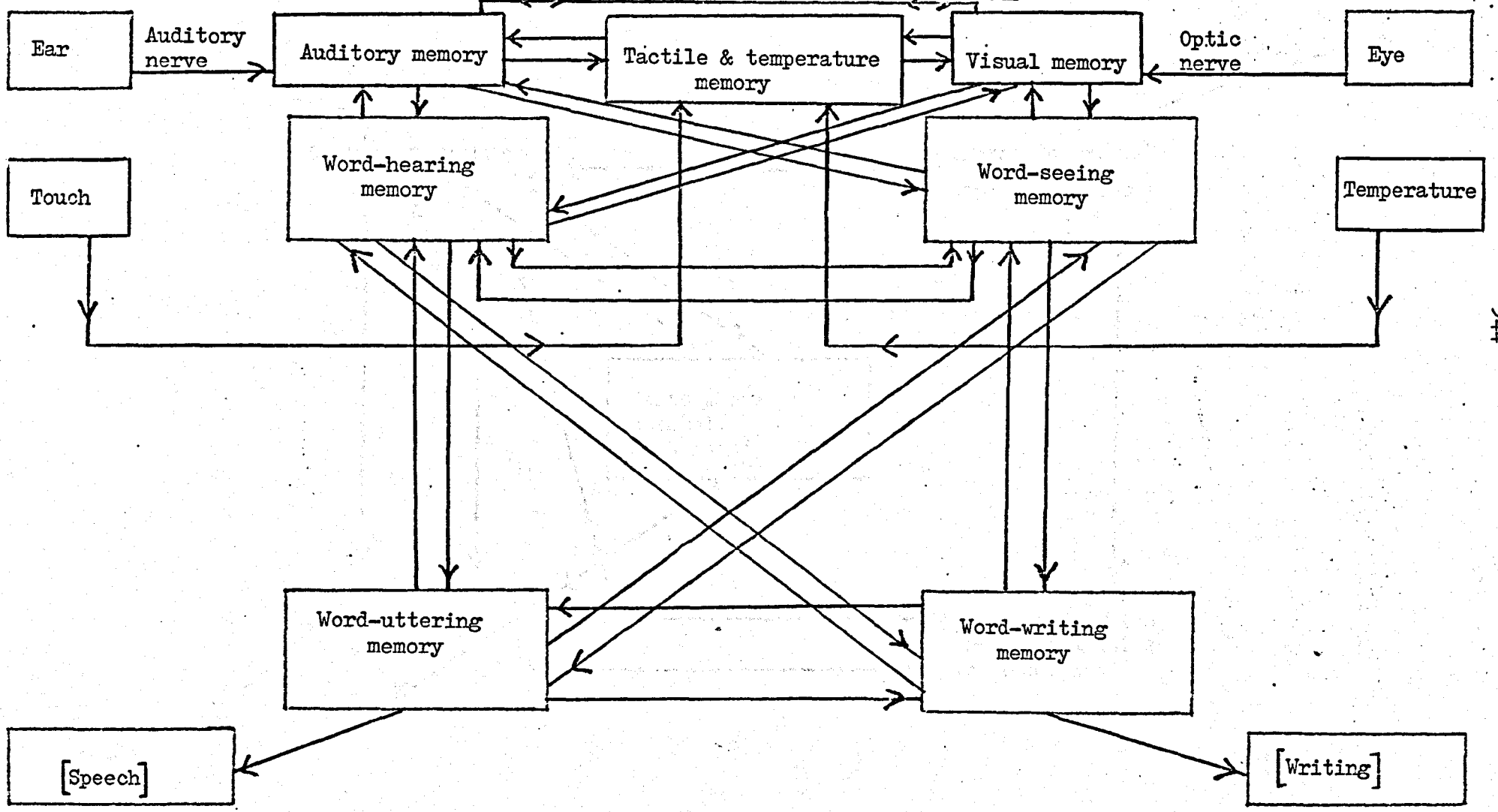
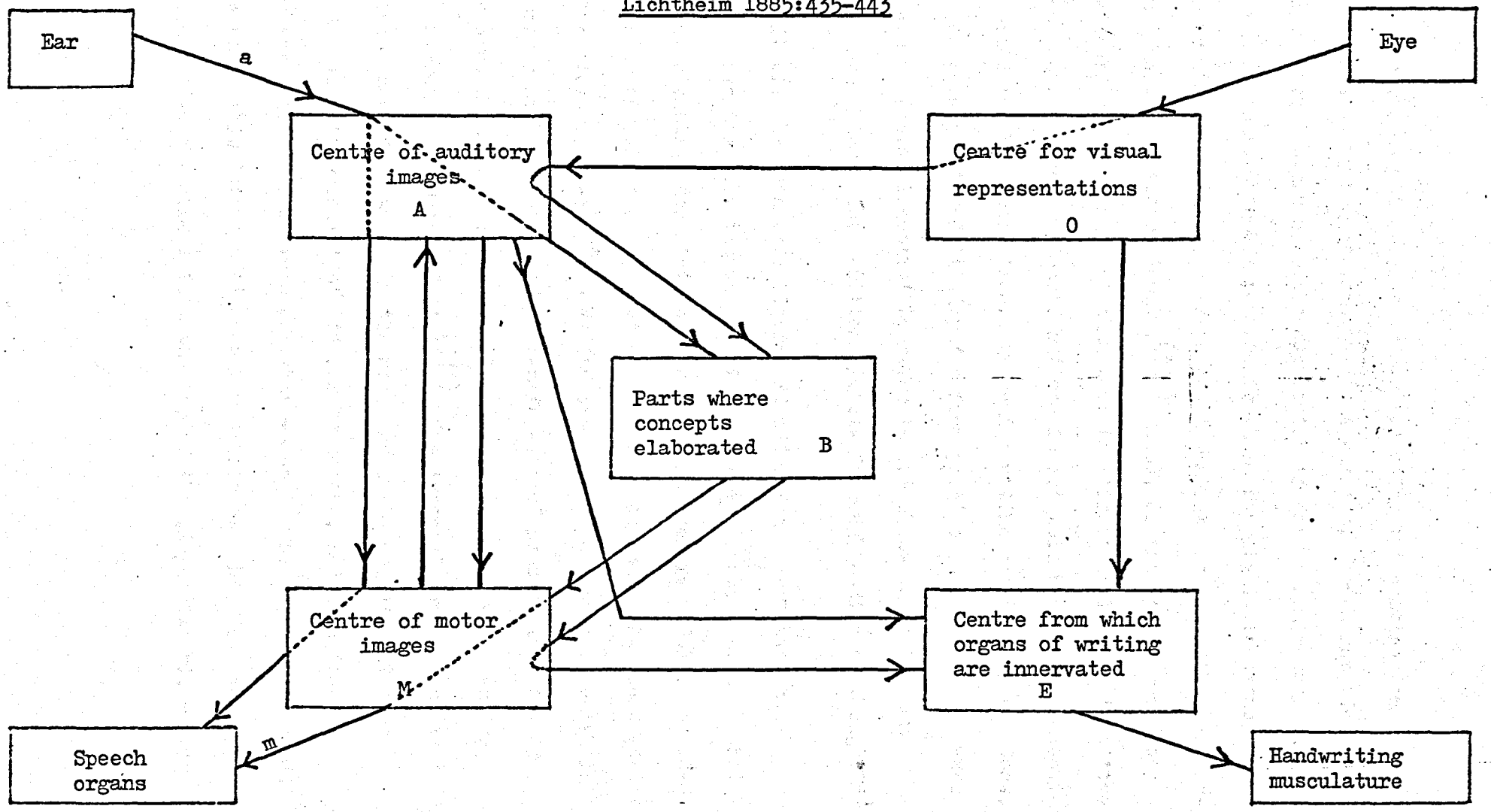


Figure 25

Lichtheim 1885:435-443



and, secondly, at which concepts are formed by the combination of the individual sensory impressions.(340) A similar, though not identical interpretation is given to the expression 'Ideas or comprehensions' by Spamer. For him, this box represents where sensory impressions 'become ideas or comprehensions'; he says nothing about its being the meeting-point of all the sensory inputs.(341) Ross, on the other hand, interprets Charcot's diagram(342) such that the 'ideational centre' is 'the common centre of conceptions', but one is not told how these conceptions are formed in the first place. And quite unlike his colleagues, Shaw, in language which is admittedly far from precise in its meaning, uses the term 'ideational centre' to refer to the place where 'spoken symbols are changed into written symbols "through medium of thoughts".(343)

It will be seen from Figures 20 and 22 that Broadbent and Stewart were the only two authors to set up <u>two</u> central boxes. What apparent advantage does this have over single-centre models? Broadbent describes his 'naming centre' - he also calls it the 'name centre' and the 'idea centre'(344) - as the area where perceptions, which in themselves are the result of a transference of sensory impressions 'into a perception or recognition' in separate perceptive centres, all converge to form 'an idea'.(345) His 'propositionising centre' is, then, the first stage in the motor output - he calls it 'the correlative motor-centre' of the naming centre, and here 'names or nouns are set in a framework of other words for outward expression'.(346) One sees in this last quotation a repetition of his earlier expressed view that nouns form the top of the linguistic hierarchy.(347)

Compared with Broadbent's explanation of the raison d'être of his two central boxes, Stewart's diagram is far from easy to interpret. What does he mean by, in particular, the 'intelligence centre'? Is it the place at which 'language' is stored, or is he using it, like the translator of Spamer (1876), to refer to the place where speech-comprehension takes place?(348)

Three British authors devised diagrams in which there was no central box: what was the motivation for this? McCosh, in his interpretation of Charcot, who, nevertheless, is credited with a central box, ('ideational centre') in Ross's interpretation of his model, describes the concept of bell as being an amalgamation of various memories, both sensory and motor: the sound of a bell, its visual appearance, its auditory quality, the sound of the word BELL as it is pronounced and the appearance of the word BELL in its written form, how the word is uttered and how it is written.(349) A very similar line of argument is taken by Ross, but he does not go into the same amount of detail as McCosh. A word is laid down, he says, in a set of sensory centres, which together make up the 'perceptive centre' of the word.(350) Unlike McCosh, however, he makes no mention of the motor aspects of the word. The one important difference between Bastian's views and those of either McCosh or Ross is that Bastian treats the 'auditory centre' as being 'primary', in the sense that words are first 'revived' there, with information then being passed to the other centres in the network.(351)

4.9.5.5 The motives for language modelling

All the models of language processing derive from a professional involvement in the study of cases of aphasia; none was devised as the result of speculating on how 'normal' users of a language process it. One might say, then, that in view of the complex variety of aphasic defects that clinicians had become aware of, especially by the 1870s, it would have been relatively easy to set up any model by drawing boxes and joining them together by lines, in order to explain any type of aphasic difficulty that had manifested itself in a clinic. In fact, Charcot's diagram (Figure 24) looks suspiciously like an attempt to pre-empt the discovery of any hitherto unnoticed aphasic problems, with its sets of interlinking lines (or, to use the 19th century term, 'tracks'). It may well be that tracks were drawn more in anticipation of an aphasic type that might have to be explained, than on the basis of one that had already presented itself. On the other hand, it must be remembered that another motivation for the construction of 'tracks' as well as 'centres' was the growing knowledge, particularly from the early 1870s onwards, of the paths of the intra-cerebral association fibres.(352) Once the anatomist had established that a particular area was connected with another area, it must have seemed legitimate to draw a track between them in the diagram. To what extent the construction of the models depended on actual aphasic data, presumed disturbances and the growth of knowledge of the path-ways within the central nervous system requires further investigation, and goes beyond the intended scope of this thesis.

4.9.5.6 Criticisms of models

Before leaving the subject, it would be well to summarize what appear to be some of the shortcomings in all of the models discussed. To begin with, there is nowhere any discussion in more precise terms of how the ideational centre is constructed of the amalgam of sensory inputs. Is there a hierarchy of inputs, such that, for example, the auditory takes precedence over the visual? In view of the fact that 19th century clinicians realised that some aphasics who could read (i.e. could process the visual input through to the ideational centre) could not understand speech, such a question would seem to have been a valid one for them to attempt to answer. Equally, the labelling of boxes does not necessarily explain their function. What precisely happens in Ross's 'centre of vocal expression' (Ross 1886k Figure 18)? And in what way, in Stewart's model, does the 'speech centre' differ from the 'motor speech centre' and the 'coordinating speech centre' (Figure 22)? In what form are the contents of Shaw's 'spoken word centre' to be visualized (Figure 19)? What exactly did Spamer mean by the box labelled 'Apprehension of hearing' (Figure 17)? Even Kussmaul's 'ideational centre' - perhaps one of, if not the most, critical of all of the sections in his schema - remains unexplained (Figure 21). Too much in all of the models is left to the reader to interpret.

One can level many other criticisms at the models. Why are words treated as though they consist only of sounds (cf. 'sound memory', 'sound images' 'auditory images'): why is nothing even hinted at about the grammatical and semantic aspects of a word?

How are these to be handled, in any case, in such a schema? Where does one locate the distinction, which some British writers on aphasia recognized to be of importance, between 'intellectual' and 'emotional language'? Equally, the distinction between 'automatic' and less 'automatic' forms of language? There is simply no way in which one can explain them, except by means of an all-embracing comment such as a 'disturbance in the spoken word centre'. Nothing in any of the models will account for the aphasic's ability to sing but not speak, nor for the often differing performances in foreign languages compared with the native language. Furthermore, operations involving 'multiple modalities' (for example, reading aloud) are nowhere discussed. And, looking at the models from primarily an anatomical rather than a psychological viewpoint, one sees that there is never any indication as to whether the brain is 'constructed' on the basis of only one model with double inputs and outputs (two ears, two eyes, two sides of the articulators etc.), or whether there are two, possibly different, models. The absence of any reference to this latter point is remarkable, given the discussion in the British literature from the 1860s onwards about the bilateral representation of 'language'.(353)

4.9.6 Errors in linguistic performance

Errors in linguistic performance (slips of the tongue, slips of the pen, etc.) are nowadays seen as valuable evidence as to the possible form in which language is structured prior to its transmission to the speech musculature. In the 19th century, the insights into the nature of language processing provided by such errors were not recognized as such. However, errors were commented upon. For Jackson, they were simply examples of how otherwise normal, 'healthy

persons' can make mistakes, some of which bear comparison with those produced by aphasics.(354) Ross appeared to view them as almost pathological aberrations: he referred to them as 'ludicrous mistakes' and quoted the case of an Aberdeen medical professor who was wont to say 'cus porpuscles' instead of 'pus corpuscles'.(355) That such errors could indeed reflect a pathological disturbance was shown by Staubback and de Watteville, who discussed the case of one particular patient. The difficulties in speaking were described as a 'functional aphasia of the "atactic" category': she would say, spontaneously, 'douring pet way', and so on. There were also problems of writing: she would sometimes write backwards. The authors recommended both a form of speech therapy and 'galvanisation of the cortical centres' as the treatment for the condition.(356)

The term 'slips of the tongue' was used by Ord (1873), but in a greatly extended sense compared with today's usage. Not only would examples such as 'suck them a plunder' be slips of the tongue, but also any articulatory changes arising directly from a temporary pathological condition of part of the vocal tract. Thus, the pronunciation of ELEMENT as 'elephant', due to a sore on the lip, would be a 'slip of the tongue'. He included in this category those articulatory forms which resulted from a 'sore and tender tongue, a sharp tooth, a sore cheek, lip, gum, a swollen throat, a choked nose'.(357)

4.10 Left hemiplegia in relation to aphasia: the emergence of the concept of 'dysarthria'

4.10.1 Left hemiplegia in "aphasia"

In May, 1864, Jackson announced that of the 31 "aphasic" patients whom he had so far examined, all had an associated right-sided hemiplegia.(358) There seemed, then, to be a strong possibility of a correlation between the two conditions. His statement was immediately tested by a Birmingham clinician, James Russell, who, from examining his own clinical records of "aphasic" patients, was able to show that left-sided hemiplegias did, in fact, occur, but with a particular type of "aphasia" - 'articulation alone was in fault'.(359) This was a factor Jackson had not foreseen. Of Russell's 39 cases, as many as 16 had had left hemiplegias; and even after allowing for cases which were not properly considered to be 'true organic hemiplegia', the number was still high, at 14.

4.10.2 The distinction between 'mental' and 'mechanical' defects

Jackson's cases all involved a disturbance of what Russell called the 'mental' element of speech, that is, the aspect dealing with 'form[ing] ideas or ... find[ing] words', whereas, in all of Russell's left hemiplegic "aphasics", the other element of speech was disturbed, the 'mechanical'. The descriptions he gives of his patients' speech exemplify this conclusion: 'speech a little drawling',(360) 'articulation ... "slipshod"', 'speech rather indistinct'. Russell then made it clear that what he was not saying was that if articulation were affected, there should be a left hemiplegia: only if articulation (and no 'mental' feature) was affected, would there be such a hemiplegia; if an articulatory problem were present together with some

form of 'mental' defect then a right-sided hemiplegia would be found. (What he fails to clarify, of course, is how 'articulation' as a general concept can be affected in such a way that sometimes the hemiplegia is on one side and sometimes on the other. Clearly, at least two different types of 'articulatory' disturbance must be being subsumed under the single heading.) To some extent, he attempts to pre-empt such a criticism by saying that it can often be difficult to decide in cases of "aphasia" whether the defect lies exclusively in the 'mechanical' or 'mental' elements of speech.(361) With hindsight, one knows that the thesis Russell was putting forward was that the left-sided hemiplegia with accompanying articulatory disturbance typifies one major form of dysarthria, not aphasia.

Russell's views generated no direct response from other colleagues, but from considering those cases of left-sided "aphasia" that were published in the following few years, it is possible to find a certain amount of confirmation for, and equally of contradiction of, his hypothesis. In fact, even before the whole of Russell's study had been published,(362) Jackson was himself reporting a case of left hemiplegia in which the speech defect was described - somewhat coyly as if Jackson sensed that it was not quite the same as the expected articulatory disturbance in "aphasia" with right hemiplegia - as like that of 'patients recovering from loss of the faculty of articulate language - the Aphemia of Broca'.(363) It was not however, until 1868, that a number of cases which supported Russell's thesis were first described.(364) John Ogle, for example, provided evidence from eight "aphasic" cases to show the correctness of Russell's view.(365) Others of his "aphasic" cases did

not provide the same firm evidence. One must bear in mind, of course, that the patients suffered from at least one other deficit, either linguistic or non-linguistic, and so a left hemiplegia in conjunction with conditions described simply as, for example, 'speech affected', 'loss of speech', 'Some impediment of speech', cannot be taken as referring unequivocally to 'mechanical' disturbances.(366)

The following year, 1869, Wadham reported a case of 'atactic aphasia' (i.e. aphemia), with left hemiplegia, in which the patient 'talked in a slobbering manner, but had no difficulty in producing words, and always used the right ones'.(367) This might seem to be support for Russell, but alternative interpretations are possible. Was the aphemia the same sort of articulatory disturbance as Russell presumably had in mind? And, secondly, in view of the fact that the patient was ambidextrous, can one automatically assume that his 'faculté du langage articulé' would have been in the left hemisphere?

The weight of the published case-studies was against Russell's thesis, however. Popham, for example, reported a case of "aphasia" with left hemiplegia in which the pronunciation was 'very good' and the person was able to 'articulate.... long words, as "Constantinople", perfectly, and with the proper syllabic accent'. Furthermore, her 'memory of words' was 'much injured'.(368) Another case also involved left hemiplegia where the patient 'spoke perfectly and clearly' although according to one report - and this would suggest some form of disturbance - somewhat garrulously.(369) Jackson noted a case of 'temporary loss of speech' over a two-year period, with left

hemiplegia.(370) A further, clear counter-example to Russell's thesis was given by Bruce of a left hemiplegic "aphasic" who 'complain[ed] of not being able to "frame" the words, of "forgetting in a minute", what she had intended to say, and, generally, of forgetting names'.(371)

To attempt to resolve the questions surrounding the interpretation of these various cases was, during the 1860s, an impossible task. Let us list the reasons, all based on the hindsight of research carried out since the 1860s. First of all, the concept of a 'mechanical' element in speech requires to be more precisely defined. Does it refer to the transmission line within the cerebrum or to the more central processing of the speech signal? Secondly, is the distinction between 'mental' and 'mechanical' a useful one to draw? The experience provided by linguistic studies, certainly from the time of Saussure onwards, would suggest that it is not: to separate 'words' on the one hand from the 'articulation' of words on the other leads to an unworkable distinction.(372) Thirdly, unless the nature of the 'articulatory' disturbances is spelt out, a vague generalization is likely to obscure many subtleties. And fourthly, the question of laterality requires to be taken into account, even though, as we now know, the correlation of handedness with dominant hemisphere for speaking is not an exact one.

The distinction that Russell made between the 'mental' and the 'mechanical' aspects of speech was important for another reason: it drew attention to the possibility that another syndrome, different from aphasia, might exist. This possibility had indeed been intuitively appreciated for many years. Clinicians, well before

1864, had recognized that some patients suffered a 'loss of the memory of words', whereas with others the speech was 'thick' or 'indistinct' or 'slurred' etc.(373) It was during the 1860s and 1870s that the distinction between two basically different forms of neurolinguistic disorder was formally recognized, both in terms of their symptomatology and etiology.

4.10.3 Paralysis as the characteristic of dysarthria

In 1866, Gairdner proposed a three-way distinction between 'the ideation of language', 'the innervation of language' and 'paralysis properly so called'.(374) The latter is probably dysarthria. Three years later, Bateman was emphasizing the need to keep quite separate from each other two conditions: aphasia and what he called, following Trousseau, labio-glosso-pharyngeal paralysis, a 'mechanical defect dependent on paralysis of the tongue, lips, and the muscles of the larynx'.(375) This is the first term in English for what Russell meant (or probably meant) by a 'mechanical' defect.

A few years later, another term, 'glosso-laryngeal paralysis' came into use, first by Dowse(376) and, later, by Charcot.(377) One presumes that the actual phonetic features of what Dowse and Charcot described would have been different from Bateman's type: in effect, they would have been two different types of dysarthria. This interpretation is borne out by Bristowe, whose first (of four) 'paralytic affections of articulate speech' included 'locomotor ataxy', 'glosso-laryngeal palsy' and 'lesion of one or more of the motor nerves of the organs of speech'.(378) The concept of dysarthria as a paralysis (as in the comments quoted above by Gairdner, Bateman,

Dowse and Charcot) was to be found in due course in the works of other neurologists: David Ferrier and Ross, for example, wrote of the 'paralysis of articulation'.(379)

4.10.4 Introduction of the term 'dysarthria'

The term 'dysarthria' was not used in English until 1878, some nine years after its sister-term 'anarthria' had been coined.(380)

4.10.5 Ataxia as the characteristic of dysarthria

The concept of an ataxia (or ataxy) rather than a paralysis as the defining feature (in neurological terms) of the condition appears in a number of works in the 1870s. It is found in Bristowe's 'ataxy of articulation';(381) Tamburini's 'glosso-ataxia'(382) and Gallopain's 'labial ataxy' and 'glossal ataxy'.(383) Apart from Gallopain, who describes no site of the lesion, the locus is taken to be the pons or the pons and medulla. Similarly, on the basis that Gowers also specifies the lower part of the pons and the medulla as the locus, it would seem that his 'anarthria or dysarthria' can be equated - at least broadly - with the other clinicians' forms of ataxia.(384) But whether the term 'dysarthria' as used by Suckling and defined as 'defects of articulation' may also be grouped with Gowers' term and the 'ataxias' is debatable, if only on the grounds that nothing is said by Suckling as to the site of the lesion.(385)

4.10.6 Differing interpretations of 'dysarthria'

It might be presumed that the use of the term 'dysarthria' would be a sufficient guarantee of identity: this is not so. In Kussmaul's schema of language disorders grouped around aphasia, cortical dysarthria or central dysarthria is seen as equivalent to

ataxic aphasia, called aphemia by Broca.(386) Furthermore, the wide neurological foundation ascribed by Kussmaul to dysarthria (a disturbance of the 'motor act by the external organs of speech and the peripheral and central nervous apparatuses through which multifarious co-ordinated inner and outer movements take place'),(387) is too general to be equated with, say, Gowers' concept of dysarthria. One sees then, the generality of Russell and Kussmaul giving way in time to a much narrower specification of what constituted dysarthria. Furthermore, one should note that since Gowers' time, the concept of dysarthria has been widened to the extent that the site of the lesion is as diffuse as in Kussmaul's definition of 1878.

4.10.7 Is "aphasia" aphasia + dysarthria?

Thus far in this thesis, the term "aphasia" has been used as a cover-term for a particular range of linguistic disturbances arising from brain-damage. It has included, therefore, what today would be separate syndromes: aphasia, dysarthria and dyspraxia. With the emergence in the 19th century literature of aphasiology of the term 'dysarthria', can one conclude that the term "aphasia" will be redundant, and that, from now on, it should be re-styled 'aphasia' and 'dysarthria'? The answer is, simply, no. Not only was there no agreement amongst clinicians as to the actual linguistic and neurological conditions included within the term 'dysarthria' (see above); but also, some clinicians continued to use the term 'aphasia' as though 'dysarthria' did not exist. For these reasons, then, the generality of "aphasia" must be tolerated.

4.11 Speech-comprehension

We have already seen in Chapter 2 that certain clinicians in the British Isles had recognized cases of sensory aphasia before Wernicke's famous work of 1874, which dealt in part with this subject.(388) The topic of a disturbance of speech comprehension continued to attract the attention of clinicians after 1874. Between 1875 and 1894 there was a period of four years, from 1885 to 1888, during which a disproportionately high number of examples of it were discussed in the literature, or attempts were made to take stock of the topic in the light of both British and Continental work.

4.11.1 Cases with no impairment of speech-comprehension

Eight case-reports of aphasia noted that there appeared to be no loss of speech-comprehension.(389) One of these, that by Hugh Bramwell (1886) requires further discussion, however.

Bramwell's patient had suffered an injury to the left side of his forehead. The linguistic effects were restricted to his 'memory for the names of things [being] very defective'; his ability to read and to understand speech were, however, completely unaffected by the injury. And yet, the post-mortem revealed, in addition to a disturbance of 'Broca's convolution' and a flattening generally of the gyri in both hemispheres, 'a large glioma and softening in the whole of the temporo-sphenoidal lobe' was found, which extended backwards to the posterior horn of the lateral ventricle. This was the precise area (and more) that Wernicke and other clinicians had already specified as being the one that would lead to sensory aphasia. In Bramwell's case, however, there was none. Bramwell offers no explanation - indeed he does not even refer to this piece of evidence that contradicted

the theory of the location of the lesion in sensory aphasia!

4.11.2 Diagnosing a disturbance of speech-comprehension

In all of the cases in which the ability to comprehend speech is mentioned, either because it was disturbed or unaffected, there is rarely any hint that the diagnosis of sensory aphasia may be a difficult one to make. One knows nowadays that to diagnose a sensory aphasia it is necessary to try to rule out the possibility of a dyspraxia interfering with the aphasic's capacity to respond to what is said to him. Furthermore, one now recognizes that there are undoubtedly degrees of disturbance of speech-comprehension: a simple yes/no decision cannot be made. It is, therefore, of interest to note that, occasionally, the diagnosis of a receptive disturbance is mentioned as not having been an easy one to make. Broadbent, for example, points out that 'It was difficult to make out how far [the patient] understood what was said to him, his answers being unintelligible'.(390) Byrom Bramwell, too, noticed that, in his case, the diagnosis was compounded in difficulty by 'a very marked word-blindness, with apparently some degree of motor aphasia (aphemia) in addition'.(391) Weekes may also have been aware of the problem, for he wondered if his patient had become deaf as a result of the injury.(392)

But these reservations about the diagnosis are in a minority. The majority of cases confidently report a disturbance of speech-comprehension, using, in many cases, the phrase that had been commonplace in case-reports since the early part of the 19th century: 'understands what is said to him/her'.(393)

4.11.3 Cortical areas and sensory aphasia

4.11.3.1 Case-reports

An examination of the results in the case-reports of post-mortem analyses of aphasic brains shows that certain characteristic areas were held to be in some way responsible for the disturbance of speech-comprehension. Four areas single themselves out: [the] supra-marginal gyrus, the angular gyrus, the post-central gyrus and the superior temporal gyrus. In addition, and overlapping to some extent with these four, is the area of cortex served by the posterior branches of the left middle cerebral artery. Thus, in the individual case-reports from 1885 to 1893 in which localization of damage is mentioned, the site of the lesions becomes progressively smaller: from the supra-marginal, angular and superior temporal gyri,(394) through the superior temporal and supra-marginal gyri,(395) to the superior and middle temporal gyri.(396) It would seem, then, that the temporal lobe was the area most likely to be involved.(397)

There was, however, a significant exception to this line of reasoning. Reynolds reported, in 1893, a case of word-deafness accompanied by some 'secondary slight word-blindness' and verbal amnesia.(398) The post-mortem revealed old softening in the superior temporal gyrus, but recent haemorrhaging in the left internal capsule; there was, furthermore, no lesion of the angular or supra-marginal gyri. Very regrettably, there is no discussion of these important findings.

4.11.3.2 Generalizations

Turning to the literature which provides generalizations about sensory aphasia rather than discusses individual cases, one finds that, certainly in the 1880s, there was no agreement amongst clinicians as to the location of the lesion(s) in sensory aphasia. Kussmaul simply does not mention a particular area;(399) Lichtheim says only that it is 'probably in the temporal lobe' of the left hemisphere;(400) Ross states that it is 'in the first and second temporo-sphenoidal convolutions',(401) but, then, on his diagram of a lateral section of cortex marks only the superior temporal gyrus as the area!(402) Ladd criticises Exner's view that word-deafness is caused by a lesion in the middle termporal gyrus, on the grounds that Exner's data was too limited in both number and type of patients.(403)

Undoubtedly the most important study of the location of the lesion in sensory aphasia was that by Starr of 50 cases of 'sensory aphasia', culled from the published literature and including some British, American, French, German and Italian cases.(404) He used a scale of measurement of 'power to understand speech' (3 degrees: 'good', 'impaired', 'lost'),and found that the majority of cases of 'lost' power involved damage in the superior and middle gyri, followed by those in which only the superior gyrus was damaged, and a smaller number in which all three temporal gyri were damaged. 'Impaired' power was found to correlate more with damage to the first and second gyri.

Of considerable significance for and in constrast to the trend which showed a marked preference for the first (and second) temporal

gyri as the seat of the damage, there were a handful of cases in Starr's data which contradicted these findings. The ability to understand speech was rated 'good' in two cases in which the superior temporal gyrus was damaged,(405) and in two further cases in which both the superior and middle gyri were damaged.(406) In addition, there were two cases of 'impaired' ability but no damage whatever in the temporal lobe.(407) In attempting to interpret these cases, one must take into account, as best one can, the fact that symptoms other than a disturbance of speech-comprehension were, in all cases, part of the patients' conditions, and therefore, damage in the temporal lobe might be linked to some other symptom.

The study by Shaw (1893), although on a much more limited scale than Starr's, concluded that, on the basis of six cases of 'word-deafness' in the literature, 'there is a distinct association between the first and second temporo-sphenoidal convolutions and the phenomenon of word-deafness'.(408)

4.11.3.3 Conclusions

The only certain conclusion that can be drawn from the above summary of what was presumed to be the site of the lesion in sensory aphasia is that it appeared to centre on the superior temporal gyrus, in the area that Wernicke had specified in 1874. On the other hand, damage in other areas could not be accounted for without a considerably more rigorous examination of both the linguistic symptoms of the aphasics and the state of their brains. As with Broca's thesis, one relatively precise area of cortex appeared to be involved in the process of speech comprehension, yet on balance and for reasons connected with the variegated disposition of the intra-cerebral

fibre tracts, a wide range of cortical areas seemed to be intimately linked to the process of speech-comprehension.

The analysis of the aphasics' speech-comprehension capacities in terms of a more sophisticated theory might have led, in turn, to a subtler set of results. In defence, as it were, of the 19th century aphasiologists, there is no doubt that the type of theory they needed in order to investigate more closely the forms of breakdown in speech-comprehension did not exist: one might even say that such a desideratum is still, to some extent, lacking today.

4.12 Other semiotic modalities

4.12.1 Writing

In the period up until 1862, a certain amount of interest was shown by clinicians in the question of writing disturbances in "aphasia".(409) From 1864 onwards, this interest was continued and, indeed, intensified in certain respects: William Ogle established the concept of 'agraphia' in 1867 as a distinct syndrome from 'aphasia', and suggestions were made as to the site of the lesion that caused the condition.(410) Examples of agraphic material were published, often in facsimile form,(411) and some consideration was given to how the writing capacity of aphasics might be tested.(412) In general, however, the interest in the subject of agraphia did not lead to any major theoretical developments.

Ogle recognized that the existence of agraphic disturbances independently of aphasia argued for the existence of two independent 'faculties': those of writing and speaking. This assumption formed

the basis of all of the subsequent attempts to locate the area in the brain that was concerned with the ability to write. Two views existed as to the site of the 'graphic' centre. Firstly, it was held to be near to the left inferior frontal gyrus - Exner located it in the posterior part of the middle frontal gyrus,(413) and in this he was followed by Bastian, although the latter remained unwilling to commit himself totally as to the exact location of his 'cheiro-kinaesthetic centre'.(414) Secondly, in the opinion of the Italian clinician, Giampietro, one of whose papers was précised in the British medical press, it lay in the temporal, not the frontal lobe. He located the 'ideographic centre' more precisely at the 'extremity of the second left temporal convolution'.(415) Wyllie, in his Disorders of Speech (1894) remained non-committal, however, about the site.(416) One may conclude, therefore, that by the end of the 1864-1894 period, clinicians still felt unable to determine with genuine accuracy the site. Some of them may, in any case, have appreciated the difficulties in attempting to localize a topic regarded as 'exceedingly complex and various'.(417, 418)

4.12.2 Reading

Compared with the pre-1864 years, the period from 1864 onwards was noticeable for advances that were achieved in the understanding of neurological disturbances of reading: what many clinicians referred to as 'word-blindness'. It was recognized that this was a condition that might improve of its own accord or with training; it was also recognized that a specific area of the cortex appeared to be responsible for reading processes.

Almost all of the cases described dealt with total word-blindness,[419] and in consequence practically nothing was said about forms of differential impairment in those cases in which only part of the capacity to read had been disturbed. Nevertheless, despite the absence of anything like a linguistic analysis of word-blindness, most authors were able to quote varying instances of what Kussmaul described as 'the most astonishing phenomena' in word-blindness: patients who could read individual letters but not whole words (or the complete opposite); patients who when passing down a street could read the 'names upon the tavern-signs' but were incapable of reading words when stationary;[420] patients who could read but only when they were actually writing the words themselves.[421]

On the question of the localization of the reading-centre, opinions varied. Furthermore, there was nothing approaching the dogmatism associated with determining the cortical area responsible for speech. Charcot, in 1883, thought that it was 'probably in the inferior parietal lobule',[422] but, in time, other clinicians appeared to favour a slightly lower location. Bastian would not commit himself to a precise area, and opted instead for the 'occipital lobe cortex';[423] Hollander, however, stated that 'reading' was in the 'first occipital convolution'.[424] By the end of the period under consideration, the occipital lobe had generally been agreed to be the site of what Bastian called the 'visual word-centre'.

4.12.3 Gesture

There was no major study of disturbances of gesture in "aphasia" during this period. The terms 'amimia' and 'paramimia' nevertheless

came into use:[425] the former for 'loss of gesture language', the latter for mistakes in the use of gesture, for example nodding the head to indicate dissent, and vice versa. The two conditions appeared to be comparatively rare.

4.12.4 Singing

In the period to 1862, clinicians had noted that in cases of "aphasia" the ability to sing was very probably unaffected by the brain-damage.[426] In 1871, Hughlings Jackson described a case of an aphasic child whose expressive vocabulary increased, but only when he was singing rather than speaking the words: '... he can utter certain words besides [Here, there, I won't] ... but he can only do so while singing'.[427] The implication was that these words were available to the child only if uttered in the singing rather than the speaking mode; it was not a question of being able to utter certain words when they are part of an already learnt song. Jackson's comments prompted a short contribution from another clinician on a related subject. One of his child patients, a boy described as an 'idiot', could not speak, but he could hum tunes.[428]

The only apparent exception to what seemed to be a general rule that in "aphasia" the ability to sing is preserved, or at least is in advance of the ability to speak, is to be found in a case that was reported in 1886. A 15 year-old boy 'lost the artistic use of his vocal cords' following a head-injury. He 'sang falsely and out of tune ... [he] could not correctly follow the lead of another singer'. After two years, however, his singing ability had completely returned, yet he was still otherwise aphasic in the 'employment of

words for the construction of sentences'.[429] From these post-1864 cases and from the earlier ones, it did seem to be true that the ability to sing could be retained independently of a disturbance to the speaking mechanism. No explanation could be offered for it, however.

4.13 Classifications of aphasia

4.13.1 Criteria for classification

Before considering the different classificatory schemes that were proposed, we should note that the criteria used to determine the characteristics of the sub-types varied greatly. In some cases, only linguistic factors were taken into account; in others, psychological and/or physiological factors played a major part; a combination of all three types (linguistic, psychological and physiological) was also used. In most cases, a simple binary distinction was drawn (cf. today's 'expressive' versus 'receptive' aphasia); but in two schemes, those of Popham (1867) and Bastian (1869b), seven and six varieties of aphasia were set up, though without special labels being attached to any of them. (The classifications used by Kussmaul and Ross were, however, considerably more complex than any of the foregoing.)[430]

4.13.2 Classificatory systems

4.13.2.1 Sanders (1866)

The first classification to be put forward was by the Edinburgh clinician and lecturer, William R. Sanders, in a paper read to the Medico-Chirurgical Society of Edinburgh in February 1866.[431] From his wording ('Two kinds of Aphasia have accordingly been distinguished')

it seems very probable that he was merely reiterating the opinions of other clinicians: the problem is, which clinicians? He quotes no source, but in a footnote mentions Bouillaud.(432) He draws a distinction between 'Amnesic aphasia, loss of speech depending on defective memory of words' and 'Ataxic aphasia, where the loss of speech is due to a lesion of a supposed cerebral apparatus of co-ordination for the movements of articulate speech'. The latter is aphemia.

4.13.2.2 Gairdner and Keith Anderson (1866)

In the following months, two other systems of classification were described publicly within literally days of each other. At a meeting of the Philosophical Society of Glasgow, in March 1866, Gairdner noted that it was possible that there might be two 'perfectly distinct kinds of aphasia': the one affecting 'the ideation of language', that is, 'The thought or idea which tends towards verbal expression', the other affecting 'the innervation of language, or rather of speech (perhaps differing from paralysis properly so called)'.(433) Then, two days after Gairdner's paper in Glasgow, J. Keith Anderson addressed the Medico-Chirurgical Society in Edinburgh on the subject of aphasia, and described the system of classification first suggested by Baillarger, the French physician.(434) In it, 'simple aphasia' is differentiated from 'perversions of speech'. Thereafter, two varieties of 'simple aphasia' are described: 'amnesic', in which both the capacity to speak and to write is lost, and secondly, 'ataxic' in which only speech is lost. However, a more delicate distinction is then drawn between a form of ataxic aphasia in which the patient is conscious of his or her errors, and another in which

there is no such awareness.(435) Already, then, one sees in these two schemes a quite different emphasis on the criteria used to sub-classify the condition.

4.13.2.3 Popham (1867)

Popham was the next to propose a classificatory scheme, more than a year after those of Gairdner and Anderson.(436) He was to follow Anderson's precept of concentrating on the linguistic features of "aphasia" but adding thereto certain psychological and physiological factors. He makes an initial distinction between 'amnesic' and 'ataxic' aphasia, as Anderson had done, but adds synonyms for both, namely 'lethological' and 'aneural', as well as expanding on their psychological and physiological aspects. Lethological or Amnesic Aphasia is defined as 'defective speech, which is caused by partial or complete forgetfulness of language, both spoken and written, without a sufficient impairment of the intelligence, or difficulty of the articulation'.(437) Aneural or Ataxic Aphasia is 'loss of the faculty of speech ... partial or total inability to articulate words correctly ... no obvious paralysis of the tongue, lips etc ... memory of words and their signification retained ... able to write, though not to speak intelligibly'.(438)

Later in the same paper, he sets up seven different types of aphasia, based on linguistic criteria alone. (His schema is set out in Figure 26.) These are: the retention of 'oral language', the retention of the ability to repeat words after an examiner, the retention of the ability to write, and, lastly, the existence of jargon ('inane phrases and mere monosyllables'). Despite the

Figure 26

POPHAM'S SEVEN TYPES OF APHASIA

Type	Oral Language	Word-Repetition	Writing	Jargon
1	?			
2	?	✓	X	
3	?	X	✓	
4	?	X	X	
5	X	X	✓	
6	X	X	X	
7				✓

Key: ✓ = retained

X = lost

? = partially retained

(Popham 1867:13)

apparent discreteness of the seven types, Popham admits that 'In practice these states i.e. [seven types] often merge into each other';(439) thereby implying that whatever the theoretical attractions of such a system of sub-classification, it would nevertheless not prove to be consistently of practical usefulness to a clinician. And it is here in Popham's comment that one witnesses, for the first time in the study of aphasia, a dichotomy that in later years was to confound and confuse so much well-intentioned research: between what on paper might seem to be eminently reasonable and properly motivated characterisations of varieties of aphasia and what, in the context of practical realities, so often turned out to be distinctions of marginal significance for an understanding of á particular patient's linguistic condition.

4.13.2.4 Bateman (1867)

In the same month as Popham's paper was published, an alternative point of view was also being presented - again in Ireland, as it happened. At the annual meeting of the BMA in Dublin, Bateman, advocated, in essence, the position adopted by Gairdner the previous year: that "aphasia" could best be sub-classified on the basis of the distinction between a 'mental' and a 'mechanical' disturbance. Nevertheless, adding to what was already a far from clear picture, he introduced confusion by using Baillarger's term 'amnesic' but defined it quite differently from either Baillarger or Anderson.(440) Also, unlike either of them, Bateman set up two sub-types of amnesic aphasia. In the one, 'no ideas' would be 'formed'; in the second, ideas would be deemed to be present, but the words necessary for expressing them would not be remembered. His second variety of

aphasia (to which he gave no name) parallels in one respect the concept of aphemia, but in another is distinct from it by placing the emphasis not on the physiological aspect of aphemia, namely the disturbance of a particular coordinating faculty, but instead on a particular anatomical locus of damage, the 'fibres ... between the surface grey matter and the coordinating centres of articulation'.(441)

4.13.2.5 William Ogle(1867)

What to the discerning contemporary reader of the medical literature must have appeared to be the growing confusion over the attempts to sub-classify "aphasia" as first one set of criteria, now another,were employed, could not have been lessened by the system of classification put forward that same year, 1867, by William Ogle. Like Gairdner, Anderson, Popham and Bateman, Ogle sets up two basic types of 'aphasia', but then labels one of them 'amnemonic', equating it, one presumes, with 'amnesic' but defining it on a more general basis than either Gairdner or, more particularly, Bateman had done, as an 'inability ... to translate ideas into symbols'.(442) The other type, 'atactic aphasia' (cf. the 'ataxic' aphasia of Anderson et al), he describes as being equivalent to the 'aphasia of Broca': a description which, as we have seen, was in no way justified, even though he followed Broca's definition of aphemia very closely.(442a)

4.13.2.6 Hughlings Jackson (1868)

In Jackson's detailed statement of the characteristics of what he calls, straightforwardly, Class I and Class II aphasia,(443) one sees, firstly, a return to the tacit principle of sub-classifying aphasia on, almost exclusively, linguistic grounds; and, secondly, the introduction for the first time of speech-comprehension, reading and gesture into the set of criteria.

4.13.2.7 Bastian (1869)

With Bastian one again notes the emphasis being placed on the actual linguistic abilities/disabilities as a means of establishing different varieties of the condition, although other factors too are introduced (see Figure 27).(444) At the same time, the terms aphemia and aphasia are retained, but re-defined so that they are directly relatable to the actual linguistic behaviour (or lack of it) of the patient in a clinical situation. Bastian would use 'aphasia' for the condition in which a person 'can still think but not speak or write'; 'aphemia' for where the person can 'think and speak, but not write'. With this scheme, one sees, on the one hand, the wish to have available for different types of aphasia suitable labels that can be used clinically, even though some considerable redefinition of their import is required, and, on the other, to set the study of aphasia more firmly and consciously within the context of clinical practice: to see it as dealing with human beings with communication problems, not as a more abstract study using as its central point of departure the diseased state of certain brains on dissection.

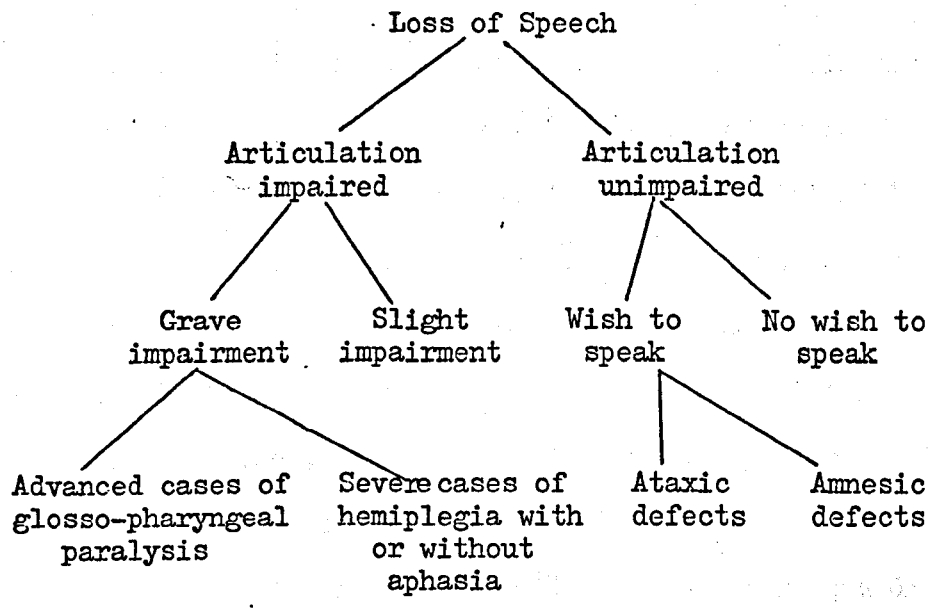
4.13.2.8 Dunglison (1874)

The attempt to establish more subtle gradations of aphasia was, in 1874, put into reverse with the publication of Dunglison's scheme. He simply listed six types of 'speechlessness': alogia, amnesia, aphasia, aphemia, alalia and agraphia, with no description, let alone discussion, of the characteristics of each type.(445) One witnesses here confusion being piled upon confusion.

Figure 27

BASTIAN'S CLASSIFICATION OF TYPES OF APHASIA

(BASTIAN 1869b:211)



4.13.2.9 Jaccoud (1875)

In an important series of lectures on aphasia, given in Paris by the French clinician Jaccoud and published in English the same year, five types of aphasia are set up according to disturbances at different points in the speech production process. Thus: 'hebetude' (if thought is abolished), 'verbal amnesia' (if there is a 'loss of memory of words'), 'logoplegia' (if there is 'suspension of verbal transmission'), 'glossoataxy', arising from the 'defective co-ordination of the movements which produce articulation of sounds', and lastly, 'glossoplegia' in which there is 'motor paralysis' of the tongue.(446) Jaccoud's 'verbal amnesia' is clearly equivalent to what the great majority of clinicians understood by the term 'aphasia'; and his 'glossoataxy' is the same as Broca's aphemia. 'Logoplegia' is a new concept altogether, and from the text of the lecture it is difficult to determine precisely what he intended by it. From its place in the hierarchy of disturbance, it would seem to refer to a disturbance of the process whereby words are converted into a series of muscular commands, but prior to being co-ordinated. The term 'glossoplegia', judging by the locus of damage ('anywhere from the cortex down to the hypoglossal nuclei'), cannot necessarily be equated directly with dysarthria.

4.13.2.10 Bristowe (1876 & 1890)

Bristowe's classification marks a return to a relatively simple scheme. He has four 'paralytic affections of articulate speech': aphemia (in Bastian's, not Broca's sense), amnesia and two compound varieties, amnesia + aphemia, and amnesia + aphemia + paralysis of the organs of speech.(447) (Bristowe retained his classificatory

scheme up until at least the seventh edition of the work in which it appeared, in 1890.)[448]

4.13.2.11 Kussmaul (1878)

The publication in English, in 1878, of Kussmaul's Die Störungen der Sprache was to introduce a welter of new ideas and terminologies to the monolingual British clinician. His classificatory scheme for aphasia is set out in Figure 28 .

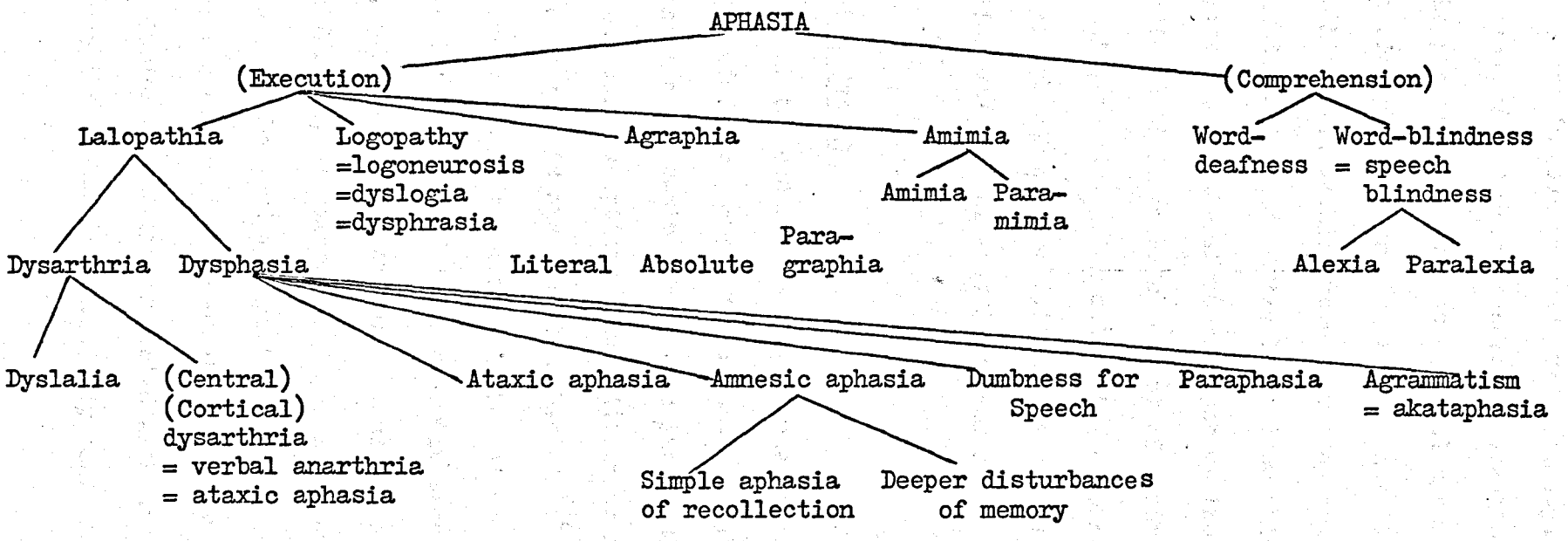
Some explanation of his terms is called for. Logopathy (or logoneurosis or dyslogia or dysphrasia) is a disturbance of thought processes;[449] lalopathia a disturbance (or rather a series of different types) of 'true disturbance of speech'. There are two types of this: dysarthria and dysphasia. The former involves a disturbance of the 'motor act', the latter a disturbance of the 'mixed senso-intellectual act' in which words are not only 'combined with conceptions as sensory symbols' but are also 'grammatically formed and syntactically arranged in order'.[450] Later in the work, Kussmaul points out that in a given case of aphasia it may not be easy to draw a clear dividing-line between an underlying dysarthric and a dysphasic condition.[451]

Two sorts of dysarthria are established: 'dyslalia', arising from 'gross mechanical defects in the external apparatuses of speech and their motor nerves'[452] - and what he calls variously 'central' or 'cortical dysarthria', or even just 'dysarthria'.[453] Synonyms for the latter are 'verbal anarthria' and 'ataxic aphasia'.

Figure 28

KUSSMAUL'S CLASSIFICATIONS OF APHASIA

(KUSSMAUL 1878:612-613, 748-9)



The latter term,'ataxic aphasia', requires explanation. Kussmaul argues that what 'Practitioners' have called 'Aphasia' includes what he prefers to regard as cortical dysarthria.(454) That is, the ataxic aphasia (deriving from or identical to Broca's aphemia) is, in his view, nothing more than a dysarthria - bearing in mind that his definition of 'articulation' on which dysarthria is based is a wide one and therefore encompasses the narrower concept of 'motor co-ordination' in Broca's concept of aphemia. 'Articulation', as Kussmaul uses it, is 'the motor act by the external organs of speech and the peripheral and central nervous apparatuses through which the multifarious co-ordinated inner and outer movements take place'.(455)

4.13.2.12 Aitken (1880)

From now until the end of the period under consideration, there existed a clear preference amongst clinicians for relatively simple schemes of aphasia: only Ross's scheme with its 19 types of aphasia (see below) is the main exception. Thus, Aitken uses the two-fold distinction between aphemia and amnesic aphasia.(456) Unfortunately, he is incorrect over one of the terms: 'aphemia' or 'atactic aphasia' he defines correctly as 'loss of motor co-ordination of words', but his other type, referred to as 'amnesia or amnesic aphemia', is defined as a 'difficulty in remembering the spoken or written words'. Apart from the use of the word aphemia here, which is either a slip or else a deliberate attempt to invest the word 'aphemia' with a new meaning, the inclusion of matters connected with the written word rather than merely the spoken is potentially confusing.

4.13.2.13 Power & Sedgwick (1881)

The categorisation by Power and Sedgwick, clinicians, like Aitken, with no published work on aphasia, could have been equally confusing to anyone trying to understand the different varieties of aphasia. They set up two categories: aphemia and aphasia. Both derive, they say, from 'damage of the cerebral centre or centres of speech'. Aphasia, however, is the generic term for a 'defect or loss of language from whatever cause'.(457) On the other hand, in the section of the work headed 'Speech', no mention is made of aphasia, but the term anarthria is used, totally idiosyncratically, for a form of speech disorder in which 'speech is entirely absent'. Completely separate from this, however, is a form of speech disorder, to which they give no name, in which the disturbance is caused by a 'central lesion'!

4.13.2.14 Bastian (further views) (1882)

Whereas Power and Sedgwick consider alalia to be a separate disorder from aphasia, Bastian considers it to be a synonym for aphasia.(458) He considers the terms aphasia, aphemia and alalia to be synonymous, but then divides aphasia into three types: 'typical aphasia', where there is a loss of the power to speak and write; 'aphemia', in which speech is lost, but the ability to write is retained; and 'agraphia', in which speech is unaffected, the only disturbance being to writing.(459) On the other hand, he recognizes that the classification of aphasia could be on a different basis, starting, for example, with a contrast between congenital and acquired conditions.(460)

4.13.2.15 Gairdner (further views) (1883)

The annual meeting of the BMA in 1883, in Liverpool, was the occasion at which Gairdner suggested a very simple dichotomy: between 'aphasia' as the 'want of verbal utterance altogether' and 'paraphasia', the 'confusion of words and phrases, or the habitual misuse of them'.(461) The latter definition is based to some extent on Kussmaul's.(462)

At the same meeting, however, Ross suggested that the dichotomy should be, as before, between ataxic and amnesic aphasia but that different terminology should be used: 'motor' instead of 'ataxic', and - heaping further confusion upon what already existed - 'sensory' instead of 'amnesic'. That is, 'sensory' would refer to a form of aphasia affecting the expression of language!(463) Fortunately, this proposal appears to have come to naught, for the following year, 1884, Ross was using the term sensory for a 'disturbance of the ingoing or impressive faculty of speech', contrasted with motor aphasia, the equivalent outgoing or expressive form..(464)

4.13.2.16 Stewart (1884)

Stewart, in 1884, uses the distinction between 'amnesic' and 'ataxic or atactic' aphasia, but defines the latter rather loosely as the inability to 'enunciate' words.(465) The terms 'dysarthria' and 'dysphasia' are also used, the former for 'defects of articulation', and 'dysphasia' for a 'disturbance of diction, rather than a loss of diction'.(466)

4.13.2.17 ~~II~~ , Cautley, Beevor (1885, 1889, 1890)

The distinction between 'motor' and 'sensory' aphasia was employed by other writers.(467) Beevor, however, introduced a third type of disorder, to which he gave no name, in which there are 'mechanical difficulties in articulation'.(467a)

4.13.2.18 Lichtheim (1885)

In his paper of 1885 on aphasia, Lichtheim describes seven types of aphasia.(468) To some of these he gives names. They can best be described in terms of where the lesion is situated in a language processing model. With reference to Figure 25, (p.345), the following types are set up:-(469)

1. Lesion in M = central aphasia
2. Lesion in A = word-deafness
3. Lesion in MA = commissural paraphasia (> insular aphasia)
4. Lesion in BM = inner commissural aphasia
5. Lesion in Mm = outer commissural aphasia
6. Lesion in AB = word deafness
7. Lesion in Aa

It is unfortunate that the English translation of Lichtheim's German original (1884-1885) is misleading. In the former, types 2 and 6 are both called 'word-deafness'; type 2 should be designated 'central word-deafness' and type 6 'commissural word-deafness'. The situation is clarified by reference to the German original.(470)

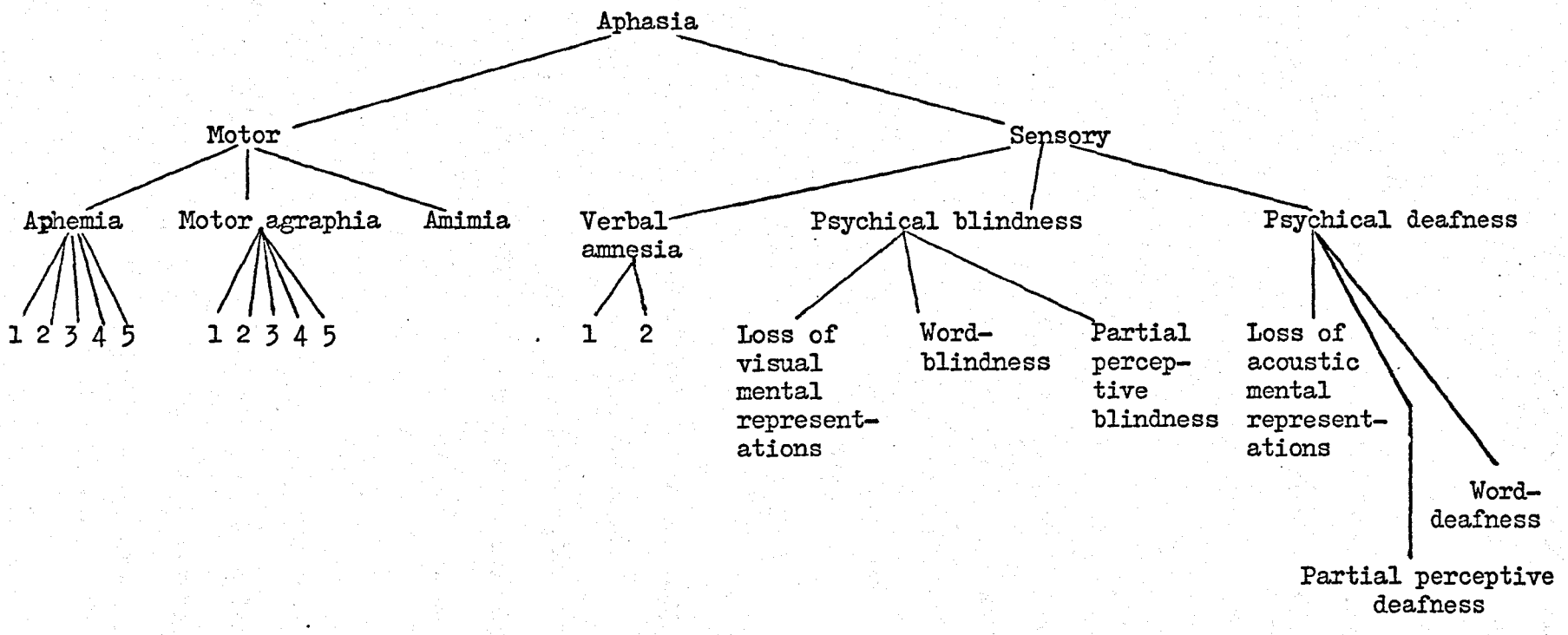
4.13.2.19 Ross (1886)

The classificatory scheme set up by Ross resulted in 19 different types of aphasia being established (see Figure 29). The basic principles in the scheme are clear enough: motor versus sensory, with a further sub-classification according to the type of motor or sensory defect. If there is an objection to the scheme, it must be that, whatever its theoretical attractions as a statement of the various types of linguistic disorder associated with brain damage, as a practical tool it is far too complex; the realities of clinical description are forsaken for more abstract points of view. Thus, one wonders whether, in a clinical setting, Ross's description of one of the two forms of verbal amnesia would have been helpful in making a diagnosis: 'the power of abstract thought is not at all impaired';(471) or another example: 'In the aphasia of recollection the idea of an object, property, or event is represented in consciousness, but it fails to revive the corresponding word in memory'.(472) Even his theoretically attractive method of sub-classifying aphemia and motor agraphia, for example, according to degrees of impairment, is based on the premise that it is easy (and foolproof) to distinguish between a Type 2 aphemic who can give only 'a few monosyllabic replies to questions' and a Type 3 who can 'give monosyllabic replies to two or three questions'. (Admittedly there are other defining criteria

Figure 29

ROSS'S SUB-CLASSIFICATION OF APHASIA

(ROSS 1886f:190, 1886g:283)



of these two types, but even so, Ross's scheme provides no indication as to how a decision is made to classify cases which appear to straddle more than one type.)

A further drawback is the plethora of new terminology: the clinician was faced with such neologisms as 'syllabic paraphasia' and 'syllabicaphemia'.(472a)

4.13.2.20 Westbrook (1890)

Westbrook sets up four classes of aphasia, to which he gives no names: loss of the 'memory of the sounds of words', inability to 'recall the visual image', 'loss of memory of muscular combinations of speech' and, fourthly, 'loss of the memory of the muscular movements for writing'. These four categories are, obviously, auditory, visual, motor and graphic aphasia.(473)

4.13.2.2. Wyllie (1894)

Finally, we should note that Wyllie used essentially the motor ≠ sensory dichotomy, together with the concept of conduction aphasia in his classificatory scheme. He set up auditory aphasia, motor aphasia (aphemia), conduction aphasia, visual aphasia and graphic-motor aphasia. To this were added three other types: compound sensory, compound motor and total.(474)

4.13.3 What did the classificatory systems achieve?

The era of aphasia classifications certainly revealed considerable differences of opinion amongst clinicians (and some psychologists) on the number of distinct forms of aphasia that appeared to exist.

Thus, in the second half of the 1880s, some clinicians distinguished only between two forms of aphasia, sensory and motor, whereas Ross concluded that there were nineteen forms of aphasia. On the question of terminology for the different categories, most clinicians used, at least as a starting-point, the two terms that Trousseau had popularized: 'verbal amnesia' and 'aphemia'. The definitions that Trousseau had given them were either retained or extended.

In all cases, the criteria used for classifying were psycho-linguistic - there were no suggestions, for example, for classifying on the basis of cortical areas: 'temporal aphasia', 'frontal aphasia' and so on; such a development was to be characteristic of some 20th century studies of aphasia. Instead, the categorization was based either on different stages in the speech production process (verbal amnesia logically preceding aphemia) or on a difference of modality (speaking versus understanding). It is worth noting, in the latter connection, that most clinicians, even after the concept of a sensory loss in aphasia had become common knowledge amongst clinicians in the 1870s onwards, nevertheless saw in the disturbance of speaking the only legitimate grounds for distinguishing between different sorts of aphasia.

Hughlings Jackson criticized generally much of the work in aphasiology because it tended to concentrate attention on only a few aspects of any one aphasic's condition in order to reach a diagnosis - that is, to find an appropriate label with which to sum up the patient's condition. The danger in this, as in <u>all</u> of the classificatory schemes proposed, was that it deflected attention away from what ought to have been the most important goal of any

investigation, namely the precise extent to which an aphasic's "language" had been disordered. What should have preceded all of the attempts to categorize aphasia was a thorough analysis of the person's "linguistic" capacities. But, as has been pointed out already, the climate of opinion within linguistics was hardly attuned to the sort of synchronic analysis (phonetic, grammatical and lexical) that clinicians should have been carrying out.

4.14 Bi-and multi-lingualism and aphasia

The subject of bi- and multi-lingualism continued to be mentioned occasionally during the period 1864 to 1894, but no interest was generated in any theoretical aspects of the subject. For example, even at a time of intense interest in language localization, no one raised the question, let alone attempted to answer it, of how different languages might be localized in the brain such that one might be lost completely as the result of the lesion, whereas the other might be spared, partially impaired, or progressively regained. The opportunity was not seized upon to develop the various hypotheses in existence on language-brain correlations. Thus, one finds the same sort of remarks as in the earlier period, but nothing of substantial interest.(475)

An example of an opportunity that was missed to develop a hypothesis on bilingualism and aphasia was the case related by Gairdner of a Welsh/English speaker who after a head-injury passed through five quite distinct stages during the recovery period.(476) Firstly, he produced only incoherent Welsh; then only English oaths; thirdly, he 'spoke Welsh but swore English'; then his Welsh was no

longer used but he continued to 'swear English'; and finally, he spoke only English. The possibility of understanding and explaining this case in later years as Jackson elaborated his theory of the dissolution of language was apparently never taken up - either by Gairdner or by anyone else.

4.15 Intellectual capacities and aphasia

4.15.1 General

The consensus view that emerged during the 1860s was that in aphasia there was likely to be some degree of intellectual impairment.(477) There were a minority of clinicians, however, who considered that in certain cases there might be no intellectual deterioration at all. It was pointed out that 'intelligence may be conserved, and remain uninfluenced by the cerebral lesion'.(478)

In the following years (the 1870s onwards), those case-reports which commented on intellectual powers in aphasia favoured the opposite point of view: that an aphasic's intellectual powers were unaffected or, if affected, only to a small degree.(479)

The difficulty about interpreting all of these reports lies in knowing what was meant by 'intellectual powers'. The implication - and it is no more than that - is that they had to do with the thinking process. If so, then it is unlikely, given the existence of aphasia in each case and the lack at that time of any sophisticated means of assessing cognitive disturbances, that any clinician could have come to a reasoned and well-substantiated conclusion about the possible

effect of aphasia on the thinking processes. General, often unsubstantiated assumptions that, for example, 'language is indispensable for thought' would have been of little practical assistance in reaching a decision.

4.15.2 Aphasia and medical jurisprudence

Connected with the matter of how much intellectual capacity is retained by an aphasic is the question of whether he is competent to be involved in matters which require legally binding decisions to be made. The most obvious aspect of this, and one that was first broached in 1861, was the testamentary capacity of aphasics. It attracted - and continues to attract - attention from both clinicians and lawyers.(480)

In 1861, Gairdner had acted for the defence in a court case involving a disputed will (it may even have been this event which drew Gairdner to the study of aphasia in the first place). He argued that the person who had made the will whilst aphasic had in fact been capable of making rational decisions, despite later suggestions to the contrary.(481) A few years later, Banks pointed out that the question of testamentary capacity in aphasia should continue to be a matter for continuing consideration by both the medical and legal professions.(482) In 1877, the matter was raised,(483) and again in 1883, 1886 and 1890.(484)

A quite separate medico-legal question was whether aphasia could be considered to result from criminal injuries.(485) The view of Casper, a forensic scientist, was that when such a question arose, the recommendation of German jurists should be followed, that

'Loss of speech is the rarest of all the ills that result from violence'. He quoted a particular case to show the difficulties associated with the question: a girl struck on the body, not the head, who then produced 'inarticulate sounds', later making a full recovery. From the point of view of a court-room, could the injury she received have been described as 'severe'?(486)

4.16 Childhood "aphasia"

Numerous cases were reported in the literature of this period on "aphasia" in children,(487) but only a few of the authors made any attempt to discuss it in comparison with "aphasia" in adults.(488) The view of Ireland, a physician from Prestonpans, was that in his experience 'aphasic children' were 'more or less imbecile'.(489) Such a statement must obviously raise doubts about the correctness of his diagnosis of aphasia in the first place.

A decidedly more positive attitude towards aphasic children is expressed by Archer. He believed that they could be 'better re-educated' than their adult counterparts because a '[portion of the brain] left unoccupied [could] take up the lost function'.(490) This view of the restoration of speech in acquired forms of childhood aphasia was the same as that being expressed at about this time by other clinicians dealing with adult cases of aphasia.(491) Whether Archer had had much (or any) experience of treating such cases is not known: he may have been making assumptions about areas of the brain which appeared, from localization studies, to be uninvolved in any physical or mental activities.

On only one occasion was anything said about the relationship between the type of language used by some adult aphasics and normal children. Moxon, in 1866, remarked that a 'person so injured [i.e. by aphasia] will be thrown back into the condition of a child, who has learnt to understand language but not to speak'.(492) However, he did not comment, for example, on the phonological similarities between some forms of adult aphasia and young children's speech.(493)

4.17 Summary and conclusions

The thirty-one years from 1864 to 1894 were the period when aphasia came to be studied most intensively. Indeed, there has been no period since in the histories of speech pathology and neurology in which aphasia has generated the same degree of sustained interest. The literature that was published, sometimes on almost a weekly basis, was indicative of how the subject had caught the attention of many clinicians.

The reasons for the interest were, firstly, the influence exerted on clinical thinking by the ideas (or in many cases the interpretations that were put on the ideas) of Broca; and, secondly, and related to this, the climate of opinion that developed strongly in the 1870s in medical circles about cerebral localization: its scientific legitimacy and its practical usefulness in diagnosis and treatment. A dominant influence here was the work of David Ferrier.

Measured solely in terms of achievements, of advances over the work carried out in the 1793-1862 period, one can point to a number of features in this period. There was, firstly, the acknowledgment

of a second, clinically attested form of neurogenic language disorder, distinct from aphasia, namely dysarthria. Secondly, one can note the work that was carried out - often to unnecessary and unjustified extremes - on discovering different varieties of aphasia. Then there was the awareness that the concept of aphasia as a disorder affecting 'speech' had to be modified to take into account sometimes simultaneous disturbances to other semiotic modalities. Fourthly, greater use was made, compared with the earlier period, of concepts from phonetics in the description of aphasic speech. And fifthly, one sees a greater interest than before in formalizing appropriate methods of assessment and treatment to use with aphasics (see Appendix C). But three further aspects of the study of aphasia during this period are, from the point of view of understanding the pattern of growth in aphasiology, of even greater importance: the differing conceptualizations of aphasia at this time; the degree of understanding that existed about the nature of language; and, thirdly, the state of localization studies in relation to aphasia.

As has been shown, there was no uniform definition of the word 'aphasia' in use amongst clinicians. Some accepted, without apparent difficulty, the concept of aphasia as a neurologically based disorder of language; others,however, recognized that the subject was decidedly more complex and that such a definition did little to elucidate the variegated nature of the subject. Thus, one finds that in almost all branches of the subject there was a lack of agreement on certain fundamental issues: for example, was aphasia a loss of 'words', was a diminution in intellectual capacities an automatic consequence of aphasia, could aphasia be explained on

strictly physiological grounds? In many cases, answers were not forthcoming, or, if they were, they were soon contradicted by other findings.

A key to the difficulty in resolving some of these questions lay in the domain of language theory. Some clinicians accepted readily and without apparently perceiving any problems attaching thereto the concept of 'language'. Others recognized that problems did exist, but in most cases they lacked the necessary intellectual theories with which to resolve them. Thus, it was early recognized that there appeared to be two aspects to language, an intellectual and a psycho-physical. But these were, in themselves, two vast subjects of study, and, in general, neither linguists nor psychologists had developed at this time sufficiently sophisticated methods of dealing with them. The clinicians were, in the main, thrown back, then, on their own preconceptions. Nevertheless, one does discern a trend whereby the question of language appeared to reduce itself to determining the nature of 'words': if this problem could be resolved, then a way forward might open up in the study of aphasia. The ideas of Broadbent, in this connection, were of importance.

On the question of "language" localization, very diverse opinions were found. Reaction to Broca's (or quasi-Brocaean) views ranged from total, almost dogmatic, acceptance on the one hand, to total antipathy and disbelief on the other. Inbetween lay a wide and sometimes undiscerning range of opinions. Certainly, by the end of this period, however, clinicians generally did appear to favour the view that the left inferior frontal gyrus played some central

part in speech production, but for a total appreciation of how speech was produced, the involvement of other cortical and non-cortical areas had to be taken into account.

* * * * * * *

In the next Chapter, I consider in detail the work in aphasia of one clinician, Hughlings Jackson. He has been selected for special study because in certain respects he was the most original thinker on matters connected with language pathology in the second half of the 19th century; also, because his ideas about the nature and processes of aphasia come closest to constituting a neurolinguistic theory.

NOTES TO CHAPTER 4

(1) Cf. Poynter 1968, and also the comments in Chapter 1 on the growth of linguistic studies in this decade.

(2) Jackson, J.H. 1864a. See also Chapter 5.

(3) Jackson, J.H. 1864a.

(4) The months of June and July 1824 produced some famous names in the study of aphasia: Wilks, Broca, Bateman and John Ogle. Later that year Gairdner was born.

(5) Head 1926:I, 54-60.

(6) E.g. Marcet, W.M. 1869.

(7) Jackson, for example, contributed more than forty articles.

(8) Althaus, . Bateman, Bristowe, Brown-Séquard, Broadbent, Carpenter, Cheadle, Druitt, Fayrer, David Ferrier, Finlayson, Forster, Gowers, Habershon, Hughlings Jackson, C.H. Jones, Laycock, Lindsay, Lewes, McDonnell, Murchison, John Ogle, Ord, Sanders, Scoresby-Jackson, Tanner, Treves, Wilks, Yeo.

(9) Interest in aphasia in France was greater than in the British Isles. One example of this can be seen in the sheer amount of time that the Académie de Médecine devoted to the subject in the 1860s.

(10) Anon. 1907a, b.

(11) Lancet ii, 1904:570.

(12) Bateman 1887 and 1889.

(13) See, for example, Popham 1867:1.

(14) DNBc:2629; Lancet i, 1928:627.

(15) See Greenblatt 1964, 1965 for further details.

(16) Lancet i, 1892:612.

(17) Mott 1916:xxi.

(18) A curious but interesting reflection on how one of the medical journals of the day viewed the whole subject of aphasia is the fact that Lawrence's article on 'Aphasia and its seat' in the St. Andrew's Medical Graduates Association Transactions (1869) was published in the section of the volume entitled 'Communications on general and social subjects', not in 'Communications on medical and scientific subjects'!

(19) Curiously, the medical profession in Wales showed no interest at all in discussing cases etc. at medical meetings. In fact, only one case-report emanated from Wales: Glissan 1875.

(20) (For full details, see Appendix A.) 1867: Dublin; 1874: Norwich; 1875: Edinburgh; 1877: Manchester; 1880: Cambridge; 1883: Liverpool; 1887: Dublin; 1892: Nottingham.

(21) 1868: East Kent; 1874: East Kent, Bristol & Bath; 1885: East Sussex, Birmingham and Midland Counties; 1888: Aberdeen, Banff & Kincardine; 1889: South East Hampshire, Birmingham.

(22) Birmingham
Midland Medical Society: 1885, 1887, 1890, 1891 (twice), 1892.

Brighton
Medico-Chirurgical Society: 1884.

Canterbury
West Kent Medico-Chirurgical Society: 1870.

Cork
Medical & Surgical Society: 1865, 1869.

Dublin
K.Q.C.P.: 1876.
Pathological Society: 1866 (twice), 1875 (twice), 1877.
Royal Academy of Medicine in Ireland: 1888, 1890.

Edinburgh
Medico-Chirurgical Society: 1866 (four times), 1872 (twice), 1887.
Medico-Psychological Association: 1866, 1887.

Glasgow
Medico-Chirurgical Society: 1865, 1866, 1870, 1871, 1887, 1888.
Medico-Psychological Association: 1882.
Pathological & Clinical Society: 1875, 1876, 1878 (twice), 1882, 1887.
Philosophical Society: 1866.

Liverpool
Liverpool Medical Institution: 1885, 1888, 1889.

London
Abernethian Society: 1888.
Anthropological Institute: 1890.
Clinical Society: 1870, 1871, 1873, 1880 (twice), 1883, 1887 (twice), 1892, 1894.
Harveian Society: 1894.
Medical Society: 1868, 1869 (twice), 1885, 1893.
Pathological Society: 1867 (twice), 1872 (twice), 1894.
Royal Medical & Chirurgical Society: 1872, 1878, 1884.

Manchester
Clinical Society: 1891.
Manchester Medical Society: 1871 (twice), 1884 (thrice).

Norwich
British Association for the Advancement of Science: 1868.

(23) Bordeaux
Congrès français de médecine interne: 1894.

Philadelphia
Philadelphia County Medical Society: 1879.

Washington
Congress of American Physicians & Surgeons: 1888.

(24) On Gairdner, see Gibson, G.A. (1912).

(24a) Ferrier, D. 1878.

(25) Bristowe 1879.

(26) Ferrier, D. 1890.

(27) Adolf Kussmaul's work on language disturbances was published, in English, as part of a multi-volume series edited by von Ziemmsen, the Cyclopaedia of the Practice of Medicine (1878). It was never, regrettably, issued as a separate work in English. If it had been, it might have led to a greater awareness of not only the work of Continental clinicians on aphasia (and other language disturbances), but also of ideas that differed from those current in the British Isles in the late 1870s. (The original German text was issued as a separate work in four editions between 1877 and 1910; a French translation appeared in 1884.)

(28) James Ross was a Scotsman by birth and education, but he spent almost the whole of his working-life within a 20 mile radius of Manchester. In his day he was regarded as 'one of the foremost of English neurologists' (Lancet i, 1892:612); since then, however, he and his work have sunk into almost total obscurity. Apart from his contributions on aphasia, he also published within the more general field of neurology: see Ross 1881b.

(29) Wyllie 1891-1894.

(30) See Br.Med.J. 1866, 1873, 1877; Lancet 1868, 1871, 1884, 1885.

(31) See Chapter 5 for a discussion of this.

(32) The raw data is as follows:

Male

Age	No. of cases	% of total male cases
0-10	13	5.098
11-20	23	9.019
21-30	44	17.254
31-40	51	20.000
41-50	38	14.901
51-60	42	16.470
61-70	30	11.764
71-80	12	4.705
81-90	2	0.784

/...

Female

Age	No. of cases	% of total female cases
0-10	12	9.160
11-20	20	15.267
21-30	24	18.320
31-40	10	7.633
41-50	27	20.610
51-60	18	13.740
61-70	16	12.213
71-80	3	2.290
81-90	1	0.763

(33) See Figure 3, p.114.

(34) See Bateman 1865:533; Banks 1865:80; Gairdner 1865-68:90; Ogle, J.W. 1867b:121; Gl.Med.J. 3, 1871:502.

(35) Sanders 1865-1866:814. Cf. also Broadbent, W.H. (in Tanner) 1875:400.

(36) Mushet 1866:79-81.

(37) See Appendix A for further details.

(38) See also sub-section 4.14.

(39) The aphasia suffered by Goethe's father is mentioned by Coupland 1874, Ogle, J.W. 1874b, and Anon. 1876. The aphasic experiences of Lord Denman, the first Lord Chief Justice of England, are recounted in Arnould 1873 (see also Spectator 1874).

(40) Lloyd 1885.

(41) The categorization follows generally that used for the discussion of the pre-1864 cases (see Chapter 2, sub-section 2.3.6 and note (38)). Additional categories have been set up to accommodate the four causes not previously noted.

A1: Trauma
Russell, J. 1866 [Case 2]; Scoresby-Jackson 1867b [Case 5]; Bramwell, J.P. 1867; Ogle, W. 1867b [Cases 3,6,16,24]; Ogle, J.W. 1868a [Case 4]; Page & Jackson, J.H. 1869; Day 1869 [Case 2]; Allbutt 1869; McCarthy 1872; Jefferiss 1873; Fayrer 1873 [Case 2]; Forster, J.C. 1874; Glissan 1875; Treves 1878; MacCormac 1878; Brown, W.H. 1880; Boyd 1881 [Cases 1 & 2]; Weekes 1881; Ross 1881a; Verall 1884; Flynn 1885; Verall 1885; Turner, J. 1885; Lloyd 1885; Bramwell, H.R. 1886; Pope & Godlee 1886; Kast 1886; Turner, G.R. 1887; Ball, C.B. 1888; Francis 1888 [Case 1] ; Glynn 1890; Beevor 1893.

/...

A2: Stroke
Courties 1865; Sumpter 1868, 1869a,b; Shaw, E.A. 1892; Küchler 1894.

A3: Meningitis
Stassin 1874.

A4: Epilepsy
Bristowe 1870a; Jackson, J.H. 1871d; Shaw, T.C. 1874; Thomas, L. 1875; Shearer 1875; S. 1885; Crocker 1887.

B2: Hysteria
Wilks 1864; Russell, J. 1864c; Tuke, D.H. 1872; Schlangenhausen 1877; Anon. 1880; Hovell, T.M. 1883; Beevor 1890 [Case 9] (see also Br.Med.J. 1873).

C1/C2: Respiratory Disorders
Influenza: Poole 1890; Stembo 1894 [Case 1].
Whooping-cough: Marshall, J.N. 1885 [Case 1]; West 1887.

C3/C4: Certain Viral Infections
Enteric Fever: Curran 1873.
Measles: Bevan 1890 [Case 8].
Rheumatic Fever: Begbie & Sanders 1886; Suckling 1892; Delépine 1892.
Smallpox: Combemale 1892.
Typhus Fever: Scoresby-Jackson 1867a [Cases 1-4].

C6: Pregnancy and Postnatal Conditions
Russell, J. 1870b [Case 1]; Druitt 1871 [Case 1]; Haynes 1872; Lewandowski 1879; Bateman 1888; Orton 1888; Stembo 1894 [Case 2]. (Bateman 1888:238 refers to a comment by 'Dr Leith Napier' on the occurrence of aphasia in a case of pregnancy. I have been unable to trace the source of Napier's comment. I am grateful to Sir Stanley Clayton for his help in this matter.)

C7: Excessive Alcohol Consumption
Jones, E.S. 1874.

C8: Syphilis
Jackson, J.H. 1875; Drysdale 1877; Lockwood 1894 [Case 1].

C9: Use of Particular Medicaments
(See sub-section 4.4.5.1.)

C10: Poisoning
(See sub-section 4.4.5.2.)

D4: Climatic Conditions
(See sub-section 4.4.5.3.)

(42) Ogle, J.W. 1868b:252.

(43) Nicholls 1869:282.

(44) Loc.cit.

(45) In 1834, Gregory had mentioned the effect that morphia could have on a person's reading capacity (Gregory 1834:162).

(46) Ogle, W. 1868. Judging by the symptoms, one of the six (Case IV) was undoubtedly a case of dysarthria, the others of aphasia.

(47) Op.cit.:170.

(48) Popham 1865:486.

(49) Raven 1874; Dupré 1894.

(50) Fayrer 1866c, 1869. 1866c is the reprint in the Edinburgh Medical and Surgical Journal of an account that Fayrer first published in an Indian medical journal (Fayer 1866a, b). It should be noted that almost half a century earlier, Abercrombie had described a case of "aphasia" directly attributable to sun-stroke (Abercrombie 1819a:6-7. See Chapter 2, note (38)).

(51) Fayrer 1866c.

(52) Fayrer 1869:236.

(53) Holland 1852:145.

(54) Sanders 1865-68:120.

(55) Moxon 1866:481; Bateman 1867:419; cf. also Fox 1866:146; Druitt 1871:34; Watson, T. 1871:490.

(56) Bateman 1869c:490. Perhaps it was a sense of almost nonchalance amongst some clinicians about aphasia that explains the total absence of any reference to speech (and aphasia) in certain neurological texts of the period. From their titles one would have assumed that works like The Nervous System and the Mind and the The Structure and Functions of the Brain and Spinal Cord would have at least mentioned the words 'language' or 'speech'; but they did not. See Ecker 1873, McKendrick 1874, Swedenborg 1882, Mercier 1888, Obersteiner & Hill 1890, Horsley 1892.

(57) Broca 1861d:330.

(58) See, for example, Gairdner 1865-68:88, 103; Br.Med.J. ii, 1866: 320; Maudsley 1868:690; Bateman 1868b:56; Hunt 1868:332; Bateman 1869b:113, 115; Bastian 1869b:209; Lancet i, 1870:838; Med.Times & Gaz. ii, 1871:360; Gl.Med.J. 3, August 1871:502; Br.Med.J. ii, 1887:1389, 1390; Bastian 1887b :931; Bastian 1890:1163; Bastian 1893:503.

(59) Lancet ii, 1868:386.

(60) Bateman 1868d:345.

(61) Med.Times & Gaz. ii, 1870:223.

(62) Broadbent, W.H. 1878a:156.

(63) Gl.Med.J.3, Aug. 1871:501.

(64) Jackson, J.H. 1864h:395.

(65) Gowers 1888:103.

(66) See Chapter 2, sub-sections 2.4.2 and 2.4.3.

(67) The medical press was not bereft of information concerning linguistic as distinct from neurolinguistic topics. Very occasionally, particular aspects of the subject appeared in the columns of the three main medical weeklies circulating in the British Isles, the British Medical Journal, the Lancet and the Medical Times and Gazette. In 1870 the BMJ reviewed a book on the putative Celtic origins of a large part of the vocabularies of Greek and Latin; the author was a doctor, Thomas Stratton (Stratton 1870; see BMJ ii, 1870:361). But like all the other medical journals, the BMJ failed to notice the appearance of another work by a doctor on a linguistic theme: B.D. Murdoch's Note on Indo-European Phonology (1887); perhaps, because following the line taken by the reviewer in the Academy (Academy 23, 1888:346), it considered it to be an inferior work.

The subject of the origin of language surfaced once, in the Medical Times & Gazette, in response to a letter from a reader requesting information on the subject. (Med.Times & Gaz. i, 1874:469.) Under the title 'Ding-dong, pooh-pooh, and bow-wow', there was a brief discussion followed by the suggestion that the letter-writer should consult Whitney on the subject.

Other topics, all synchronic with one exception (Anon. 1872 - it concerns the etymology of the word ORTHOEPAEDIC), that were touched upon, or received an element of critical attention were: spelling reform (Med.Times & Gaz.ii,1881:570), the questian of bilingualism in Wales (Br.Med.J. ii, 1886:563), animal language (especially monkey speech)(Lancet ii, 1892:617-618), universal language (Br.Med.J. i, 1894, 598-599), and the use of Visible Speech as a means of helping deaf people acquire a pronunciation of English (Jones, T.H. 1880-1882). A brief account of his paper appeared in the Br.Med.J. i, 1881:403.

(68) Br.Med.J. ii, 1866:260.

(69) Jackson, J.H. 1866f:605.

(70) Ogle, J.W. 1868a:370.

(71) Popham 1867:1-2.

(72) Lancet ii, 1868:386.

(73) Maudsley 1868:692.

(74) Russell, J. 1864a:240.

(75) Maudsley 1868:692.

(76) Jackson, J.H. 1866a:175; 1866c:659. See also Chapter 5, sub-section 5.4.3.

(77) Hunt, J. 1868-1869:371.

(78) Anderson, J.K. 1866:374.

(79) Maudsley 1868:692.

(80) Gairdner 1865-1868:88. In an appendix to this paper, Gairdner quotes Max Müller's views on 'Primitive Roots, or Nuclei, of Articulate Speech' (pp. 117-118), but none of it can be construed as being even marginally relevant for the study of neurolinguistics.

(81) Wilks 1872:154. In fairness, however, one should note that writers on language had indeed questioned the meaning of the term 'language' (see Chapter 1, sub-sections 1.8.1 - 1.8.4), but many of them had concluded, individually, that the word was susceptible of various interpretations, each one of them - at least superficially - intellectually convincing.

(82) Wilks 1872:151.

(83) ΤΤ 1885:487.

(84) Ross 1886a:265.

(85) Thacker 1870:429.

(86) Cf. Tuke, J.B. & Fraser, D. 1872b:52; Kussmaul 1878:582; Suckling 1887a:85.

(87) Tuke, J.B. & Fraser, D. 1872b:52.

(88) Kussmaul 1878:582.

(89) Suckling 1887a:85.

(90) See Chapter 1, sub-sections1.8.1 - 1.8.4.

(91) Bastian 1890a:1163. See also sub-section 4.9.4.2.

(92) Br.Med.J. ii, 1890:963.

(93) Rosse 1888:289.

(94) Broadbent, W.H. 1872:190.

(95) Op.cit.:190-191.

(96) Broadbent, W.H. 1884:255.

(97) Ladd 1887:293. Cf. also Tuke, J.B. 1872:343; Tuke, J.B. & Fraser, D. 1872b:48; Wahltuch 1884:511; Poole 1890:1191.

(98) Broadbent is reputed to have left a work on aphasia in manuscript form (see Br.Med.J. i, 1907:178; it is not mentioned in Broadbent, M.E. (1909)). Perhaps this contained some further remarks on the subject.

(99) Starr 1888:464.

(100) See sub-section 4.9.4.2.

(101) Chapter 5, sub-section 5.4.4.

(102) Cf. Chapter 1, sub-section 1.8.6.

(103) E.g. Courties 1865:268.

(104) E.g.Russell,J.1864a:82 [Case 4]; 1864b:408 [Case 1]; Jackson, J.H., 1867-1868:360 [Case 16].

(105) E.g. Barclay 1866:206 and Turner, G.R. 1887:117 - 'There was a want of grammar in the construction of his sentences, and he used only the important words'.

(106) Russell, J. 1864a:83 [Case 13].

(107) Cf. Head 1926:I, 33. See also Chapter 5, sub-section 5.5.6.5.

(108) Russell, J. 1864a:83 [Case 11].

(109) Op.cit.:84 [Case 16].

(110) Russell, J. 1864b:409 [Case 3].

(111) Scoresby-Jackson 1867a:597 [Case 1]. The actual wording may not be Scoresby-Jackson's. He was quoting from an account of the patient by the latter's doctor (see p. 597).

(112) Jackson, J.H. 1872a.See also Chapter 5, sub-section 5.4.7. Ogle, W. 1867b:113 [Case 17]; Ogle, J.W. 1868a:112 [Case 21].

(113) Pidduck 1864.

(114) Robinson 1877:591.

(115) Ross 1886b:353. The analyses of vowels by both Westbrook and Wyllie are pitifully incomplete and in places quite erroneous (Westbrook 1890:685; Wyllie 1894:opp. title-page).

(116) Scoresby-Jackson 1867a:597; Popham 1867:7; Ross 1881b:626. Cf. also Kussmaul's use of the phrase 'linguals and palatal noises' (Kussmaul 1878:629).

(117) The early 1870s were also the time when Oakley Coles developed his technique of direct palatography, which, although never used by clinicians working with aphasics, should be noted as a further example of how medical personnel were interesting themselves in the subject of speech. See Coles 1872.

(118) Bristowe 1870b.

(119) Bristowe 1879.

(120) Bristowe 1870b:119. By 'education' he meant 'treatment'. In the latter connection, see Appendix C, sub-section C.2.3.10.

(121) Op.cit.:120.

(122) Writing at a time when Sweet's major work on phonetics was still some years away, Bristowe relied for information about phonetics on five authorities: Max Müller, Johannes Müller, Ellis, Helmholtz and Webster.

(123) In Bristowe 1870a, however, he does use phonetic principles and terminology in devising the treatment he gave to an aphasic. See Appendix C, sub-section C.2.3.10.

(124) Sutherland 1876:493. He does not manage to discover the underlying patterns in the substitutions used by the patient. However, expressed in terms of rules, they are (i) m#→nd (ii) tʃ→θ (iii) labial→alveolar (iv) labio-dental→dental.

(125) Gallopain 1878:140. On the first use of the term 'dysphasia', see below, sub-section 4.7.1. and note (166).

(126) Combemale 1892:101; Stembo 1894:69 Cases[1 & 2].

(127) See, for example, his descriptions of patients in whom 'the voice was inflected naturally ... the modulation of the voice and range of emphasis were perfectly natural' (Broadbent, W.H. 1878a:150-151). Cf. also Magnan 1879b:116 [Case 3]; Moore, N. 1878:159 [Case 2]. Mitchell, R.B. 1882:244 and Stewart, T.G. 1884b:190 refer briefly to rhythmical changes in aphasic speech.

(128) Cf. '... laryngeal phonation was imperfect'; 'The action of the lips and the tip of the tongue was imperfect, and the tongue altogether seemed clumsy'; '... speech peculiar, both phonation and articulation being affected. The voice was either a shisper or a squeak; speech was slow, and word by word, with a distinct effort for each' (Broadbent, W.H. 1878b: 38-40 [Cases 1-4].

(129) Broadbent, W.H. 1879:487.

(130) Anon. 1796:6; Jones, S. 1818:xiii; Romberg 1853:I, 365; Goodrich & Atkinson 1856:vi.

(131) Richerand 1812:457; Young, T. 1845:313; Ellis, A.J. 1845:151; Carpenter 1846:466.

(132) Arnott 1827:560; Bishop, J.B. 1851:39.

(133) Bell, C. 1832:312.

(134) Wheatstone 1837:37.

(135) Müller 1838:1052.

(136) Elliotson 1840:510.

(137) Ellis, A.J. 1848:53; Smalley 1855:xxix.

(138) Nuttall 1863:vi.

(139) Bain 1864:321.

(140) Cf. Anon. 1796:6.

(141) Bell, A.M. 1867:60-62. Cf. also 1887:15; 1889:21.

(142) Bain 1868:55.

(143) Murphy 1873:260.

(144) Sweet 1877:31.

(145) Peile 1877:144; Price 1886:6.

(146) Br.Med.J. ii, 1866:258-261, 320.

(147) Whately 1844:18-20, 57.

(148) Thomson, W. 1860:27, 30, 31, 39-41.

(149) Op.cit.:41.

(150) Op.cit.:44-48.

(151) Mills, J.S. 1862:28-47, 85.

(152) Bain 1866:740.

(153) Op.cit.:737.

(154) Fournié 1866:703-737.

(155) Op.cit.:754-776.

(156) I have used the second edition.

(157) Tylor 1870:16-83.

(158) See Chapter 5, note (64).

(159) Jackson, J.H. 1864c:573. The OED gives 1867, incorrectly, as the year in which the word first appeared in print (OEDc:96).

(160) Russell, J. 1864c:619.

(161) Jackson, J.H. 1864d:167, 1864e:167.

(162) Popham 1865. See also sub-section 4.4.5.2.

(163) Bateman 1869a:490-491.

(164) The classification of aphasia is discussed below, sub-section 4.13.

(165) See Chapter 2, sub-section 2.4.3 and Figure 5, B5, 9, 11.

(166) W. Julius Mickle, medical superintendent of the Grove Hall Asylum, London, described a case in which the patient showed symptoms of 'dysphasia, dysphagia, and [a] tendency to right hemiplegia' (Mickle 1874:257). It is clear from a comment later in the same paper that 'dysphasia' was being used as a synonym for 'ataxic aphasia', that is, aphemia; not, as nowadays, for a less severe form of aphasia. (The OED does not list the word.) Incidentally, Gowers was pointing out in 1888 that the word 'dysphasia' 'does not ... seem likely to come into use, a matter for little regret, since the word has not the merit of unimpeachable exactness, and it has an unfortunate resemblance in sound to "dysphagia"' (Gowers 1888:102-103; 1893:110). How wrong he was!

(167) The most notable exception to this is to be found in the work of Hughlings Jackson.

(168) Cf. Chapter 1, sub-sections 1.7.2 and 1.7.3.

(169) See Power & Sedgwick 1881-1899:I,n.p. ; Ross 1886a:265, 269; Wagstaffe 1889: 37 .

(170) Westbrook 1890:685. Definitions which included the older terms (from the 1860s) 'articulate speech' and the 'power/faculty of articulate speech' continued to be used, but less frequently: see, for example, Ferrier, D. 1876:272; Foster, F.P.: 1888:326; Beevor 1890:60.

(171) Billings 1890:I, n.p.

(172) Cleland 1870:185. See also the definitions in Broadbent, W.H. 1875:398 and Bastian 1882a:69.

(173) Waldo 1894:15.

(174) Richet 1879:107.

(175) Foster, F.P. 1888-1892: I, 326.

(176) Cf. Watson, T. 1871:490; Carpenter 1876:750; Ladd 1891:218.

(177) Cf. Chapter 1, sub-sections 1.7.2 and 1.7.3.

(178) Cf., for example, Gairdner 1865-1868:88-89, 118.

(179) See above, sub-section 4.6.4.

(180) MacMahon, M.K.C. 1976.

(181) The term is taken from MacMahon, M.K.C. 1976:5.

(182) Robertson, A. 1867b:135.

(183) Bramwell, J.P. 1867:181.

(184) Op.cit.:180-181.

(185) Cf. Weigl & Bierwisch 1970:4-6.

(186) Robertson, A. 1871:232.

(187) Rev. of Bateman (1870) in Gl.Med.J. 1871:502.

(188) Jackson, J.B. 1884:218.

(189) See Chapter 5, sub-section 5.5.4.

(190) See below, sub-section 4.9.4.2.

(191) See Chapter 3, sub-section 3.7.

(192) Further parts, together with a reprint of the 1866 ones, were issued, by a different publisher, in 1868-1872. The pagination of the chapter on aphasia in the 1868 version is the same as that in the 1866 one.

(193) Br.Med.J. ii, 1866, 504.

(194) Lancet i, 1866:349.

(195) It is perhaps inappropriate to compare the two sets of views too closely. Broca's contributions were in the nature of scientific papers, reporting individual cases and discussing them in the light of his own and other clinicians' ideas. Trousseau's, by virtue of the fact that his lecture on aphasia was to be seen as a summary of the state of the art, of what could be judged to be the main lines of thinking on the subject at that time, is more anecdotal, more discursive, and broader in the scope of subject-matter dealt with. Thus, if Broca had had occasion to write on verbal amnesia, he might well have produced the same sort of work as Trousseau.

(196) Trousseau 1866:218.

(197) Op.cit.:219, 230.

(198) Op.cit.:268. The French original has 'phonation' (Trousseau 1865:620). One must presume that Trousseau nevertheless intended 'articulation'.

(199) Op.cit.:273.

(200) Op.cit.:269.

(201) See especially op.cit.:218-240.

(202) Parts of the Leborgne and Lelong cases are translated: op.cit.: 243-245. See also Bateman 1877:98.

(203) Trousseau 1866:241, 246, 242.

(204) Op.cit.:247, 253.

(205) Op.cit.:256.

(206) Op.cit.:248-252, 254.

(207) Op.cit.:273.

(208) Cf. the views of Abercrombie and, more especially, Dunn. Chapter 2, sub-sections 2.4.1 and 2.4.2.

(209) Jackson, J.H. 1864h:391.

(210) Op.cit.:458. See also Chapter 5, sub-section 5.5.1.

(211) Hayden 1866a:511.

(212) Loc.cit. Cf. also Atkinson's diagnosis of 'want in the power of coordination' (Atkinson 1869:381).

(213) Fox 1866:145.

(214) Bateman 1869a:492. See also Bateman 1887:6-7. Nevertheless, Bateman had considerable difficulty in explaining the distinction. See below, sub-section 4.8.4.

(215) Jackson, J.H. 1864c:572, 1864f:604. Jackson was in good company. Bouillaud, for example, had remarked at a meeting of the Académie de Médecine in Paris how Broca had localized 'le siége précis de la faculté de la parole' (Bouillaud 1864-1865b:637). Lawrence was later to state that Broca had localized the 'faculty of language' (Lawrence 1869:121).

(216) Banks 1865:63.

(217) Anderson, J.K. 1866:367.

(218) Br.Med.J. ii, 1866:258.

(219) See Broca 1864a and Chapter 3, sub-section 3.7.

(220) Br.Med.J. ii, 1866:260.

(221) Med.Times & Gaz. i, 1867:181.

(222) Bouillaud's ideas fared marginally better in the medical press in the British Isles. In the Lancet (ii, 1862:434) Bouillaud is credited with saying that 'the faculty of speech' depended upon 'integrity of the upper portions of the anterior lobes', whereas, as we have seen (Chapter 2, sub-section 2.6.5), he never volunteered any information as to where in the anterior lobes the 'faculty' was located. (There is a single exception to this statement, however: see p.169 of this thesis.) A little over two years later he was said to have localized the 'faculty of speech in the anterior lobes' (Lancet i, 1865:663).

(223) Macewen 1888:302; Roberts, F.P. 1888:865; Ladd 1891:218 (See also Cautley 1889:266). In the United States, in 1879, Richet, for example, had correctly stated Broca's views - but without mentioning Broca by name (see Richet 1879:108).

(224) Broadbent, W.H. 1872:172.

(225) Browne, W.A.F. 1872:281.

(226) Robertson, A. 1871:230; Gl.Med.J. 1871:502; Ross 1886e:102; Holmes 1888:595.

(227) Cf. the remarks by Jackson, Hayden and Atkinson, quoted above.

(228) Bateman 1877; see also Bateman 1872. Bateman's thesis is that Darwinism can be rebuffed on the grounds that language is the attribute of Man, not of animals; that even the Ape's brain does not contain as developed a left inferior frontal gyrus as man's does. (The work is not mentioned by Oldroyd 1980.)

(229) These quotations are taken from pp.73, 89, 116, 89, 158, 91, 97-98 and 147.

(230) Op.cit.:181.

(231) Op.cit.:89.

(232) Op.cit.:116.

(233) Op.cit.:97-98. He even states that Broca had localized the 'seat of speech' in the 'third left frontal convolution', then proceeds to quote counter-examples to Broca's thesis of 'loss or impairment of language' (pp. 141-142).

(234) Op.cit.:116, 117,125, 148, 180.

(235) Op.cit.:94. His terms 'internal speech' and 'external speech' are taken from Bouillaud. Yet, Bouillaud's 'parole extérieure' does not correspond to Bateman's 'external speech'. See Chapter 2, sub-section 2.6.5.

(236) Stewart 1884b:194.

(237) Starr 1889:84.

(238) Ferrier, D. 1878:517.

(239) Ross 1886e:104.

(240) Ogle, W. 1867a:14. Cf. Ogle, W. 1867b:106.

(241) McCarthy 1872:706.

(242) McDonell 1877:452-453.

(243) Magnan 1879a:199 [Case 1].

(244) Lewandowski 1879:582.

(245) Hayden 1866a:510.

(246) Hayden 1866b:541.

(247) Banks 1866:489, 491. The reference to Jackson and the middle cerebral artery is discussed in Chapter 5, sub-sections 5.6.2 and 5.6.3.

(248) Russell, J. 1865:283.

(249) Sanders 1865-1866a:822.

(250) Op.cit.:820.

(251) Popham 1867:22.

(252) Oedmannson 1868:501.

(253) Anon. 1866b:19.

(254) Clarke, J.L. 1874:342; Shaw, T.C. 1874:575.

(255) Coats 1875:114.

(256) Magnan 1879a:199 [Case 2].

(257) Med.Times & Gaz. ii, 1874:242. Dr. Dowse was the author of a paper on glosso-laryngeal paralysis (Dowse 1873).

(258) The fact that he had published on the subject of glosso-laryngeal paralysis might have coloured his views of aphasia.

(259) Jackson, J.H. 1864h:388.

(260) Gairdner 1865-68a:119.

(261) Russell, J. 1866:568 [Case 1].

(262) Sanders 1866:657.

(263) Fox 1866:146.

(264) Scoresby-Jackson 1867b:704.

(265) Ogle, W. 1867b:120.

(266) Thurnam 1867:24.

(267) Wilks 1868:57.

(268) Carpenter 1869:647. The work was edited by H. Power, despite the fact that Carpenter was still alive (he died in 1885).

(269) Broadbent, W.H. 1872:172. See also, in similar vein, Charcot 1883-1884:21.

(270) Ferrier, D. 1878:518.

(271) Loc.cit.

(272) Russell, J. 1864b:408.

(273) Gairdner 1866-1867:12.

(274) Bateman 1868c:277.

(275) See Chapter 2, sub-section 2.6.2.3.

(276) Tuke, J.B. & Fraser, D. 1872b:53: 'aphasia without any visible lesion is by no means uncommon'. Charcot, although admittedly dealing with a case specifically of glosso-laryngeal paralysis, not aphasia, could find 'no perceptible alteration in the brain proper and the different parts of the isthmus' (Charcot 1881:364).

(277) Bateman 1869d:389. Cf. Johnstone 1879:991, and the remarks on microscopic examination of aphasic brains in Chapter 2, sub-section 2.6.2.4 and note (180).

(278) Bateman 1869d:389.

(279) Op.cit.:389-390. Cf. also Thornley 1876:113.

(280) Tuke, J.B. 1865-1866:1047 [Case 2].

(281) Palmer, W.J. 1866:178 [Case 2].

(282) Simpson 1867:670.

(283) Day 1869:268.

(284) Lawrence 1869:124. A patient under the care of a doctor in Bristol whose case was reported by Hughlings Jackson (1867-1868:351) may be relevant too: 'Broca's spot ... was implicated as well as much else, yet the patient spoke well'. There is no indication, however, as to whether a small degree of aphasia existed or not.

(285) Foulis 1879:383-384.

(286) Mills 1879:119 [Case 3].

(287) Bateman 1867:420 [Case 2], [Case 3], 540; Bateman 1868c:277 (20 cases in all); Bateman 1868d:352-354 [Case 2]; MacKenzie 1871:852; Treves 1878:379.

(288) Dubl.Q.J.Med.Sci. 42, 1866:439-440; see also p.445 thereof.

(289) Lancet i, 1866:349.

(290) Maudsley 1868:722.

(291) Op.cit.:691. See also the doubts he raised about Broca's understanding of the term 'faculty of speech' (sub-section 4.6.2 and note (73)).

(292) Bateman 1869c:488. See also Bateman 1869d:377.

(293) Day 1869:268.

(294) See above, sub-sections 4.8.7 and 4.8.8.

(295) Watson, T. 1871:498.

(296) Dodds 1878:467-468. His view was commended enthusiastically by Aitken 1880:485-486.

(297) Bristowe 1879:615.

(298) Meynert 1885:142. Another German, Exner, considered in any case that the evidence of lesions showed that the area should be widened (Exner 1881:52).

(299) Ladd 1887:295. This view is at variance in some respects with that expressed by Ladd in the same work, p.292. For other views, see Dupuy 1877:35; Potter 1882:27. For Broca's comments on the role of the insula, see Chapter 3, sub-section 3.6.

(300) See Lancet i, 1871:860; Watson, T. 1871:499; Potter 1882:26; Ladd 1887:292.

(301) Jaccoud 1876:445.

(302) Brown-Séquard 1877a:219-220.

(303) Buchanan, quoted in Robertson, A. 1879:78.

(304) Allbutt 1883:314.

(305) See in addition the views of Bateman, quoted above.

(306) The views of Hughlings Jackson on this subject are dealt with in Chapter 5, sub-sections 5.6.3 and 5.6.5.

(307) Young, J. et al 1870:223 and Plate opp. 289. Cf. also Bateman 1869d:381.

(308) See, for example, Jackson, J.H. 1864c:572 and Chapter 5, sub-sections 5.6.2 and 5.6.3.

(309) In chronological order, these were: Banks 1866:491; Fox 1866: 146; Begbie & Sanders 1866:124; Ogle, W. 1867a:14; Bateman 1869d:381; Russell, J. 1870a:155; Mackenzie 1871:852; Laycock 1871:152; Power 1871:764; McCarthy 1872:706; Little 1875:176; Benson 1876:483; Broadbent, W.H. 1875:401; Wilks 1875:71-72; Barlow 1877:103; Broadbent, W.H. 1878a:154; Robertson, A. 1878a:735 [Case 2]; Bristowe 1879:733; Ross 1881b:622; Bastian 1882a:70; West, S. 1885:157; Turner, J. 1885:700; Ross 1886e: 98; Cautley 1889:267; Rosse 1888:290; Reynolds, E.S. 1893:101 [Case 2]. In addition, there were case-reports of aphasia in

which no post-mortem was carried out, but the authors of which were convinced that a disturbance of the flow of blood in some part of the middle cerebral artery would later be found to have been the cause of the aphasia: Dale 1878:454; Mallins 1883:895; Ross 1884a:511 [Case 3]; Suckling 1885:918; Suckling 1886:691 [Cases 1 & 2]; Suckling 1887b:1316; Tomkins 1894:908.

The only contrary evidence to Jackson's theory came from Alcock (1869:651), who found disease in the basilar artery.

(310) Robertson, A. 1872:309.

(311) Bateman 1869d:381. This view originated, according to Bateman, with Broadbent.

(312) Kussmaul 1878:671-672, 675, 677, 679, 682, 688-689. Cf. also Ogle, W. 1867b:91-92 'We do not know with precision how the fibres run which connect any given portion of the convolutions with the organs below', Ranney 1881:22 and Luys 1881:26-33.

(312a) Cf. Meyer 1971: passim.

(313) Brissaud 1882:504.

(314) Prior to the publication of Kussmaul's work, the only details that had appeared in the British medical literature concerned Spamer (see Spamer 1877).

(315) See below, sub-section 4.9.4.2.

(316) Cf. Young, R.M. 1970:224-243.

(317) Only aphasic data was taken into account. Had the authors of the various proposals considered other forms of speech pathology, for example, stammering, they might well have set up slightly different and perhaps more detailed models.

(318) Jackson, J.H. 1864a:123. Cf. similarly Sanders 1865-1866a:813; Gairdner 1865-1868:105; Popham 1867:6-7; Bateman 1867:419; Ogle, W. 1867b:94; Wilks 1868:57.

(319) Cf. 'centres for articulation', 'coordinating centres' (Robertson, A. 1867:136 [published in August 1867]) and 'motor centre' (Popham 1867:7 [published 1 August 1867]).

(320) Maudsley 1868:722.

(321) Bastian 1869a:63. It was used again a few months later, independently of Bastian, by Davies (1869). In his earlier work connected with brain functioning (e.g. Bastian 1865) he had had no occasion to refer to the concept, let alone use the term.

(322) Bastian 1869b:216.

(323) Op.cit.:477.

(324) Op.cit.:477-78.

(325) Bastian 1869c:455.

(326) In 1875:188 he referred to the existence of 'speech centres' in the brain, but said nothing more about them except that 'Broca's convolution' was not 'the seat of any supposed faculty of language' (op.cit.:207).

(327) Bastian 1887b:987 et passim. The 'glosso-' and 'cheiro-' morphemes are sometimes omitted in the exposition of his ideas in the paper.

(328) Op.cit.:933.

(329) Op.cit.:986.

(330) Whether they do link, but through the intermediary of the auditory or visual centres (or both), is left unstated. Bastian repeats his diagrams of the four centres and their cortical locations in other works. It is noticeable, however, that in his book Aphasia and Other Speech Defects (1898), the locations of the auditory and glosso-kinaesthetic centres are altered slightly: the former is more anterior, and the latter more ventral. Cf. 1887b:986, 1890a:1164, 1893a:504, 1897a:67, 1897b:935 with 1898:144.

(331) Head 1926:I, 57.

(332) Bastian 1897a:67, 78-80.

(333) Bastian 1897b:935.

(334) Bastian 1899:395.

(335) Head 1926: I, 57.

(336) Loc.cit.

(337) See Kussmaul 1878, Stewart 1884b, Lichtheim 1884-85 (= Lichtheim 1885), Ross 1886, McCosh 1886, Bastian 1887b and Shaw, E.A. 1893.

(338) Baginsky 1871, Wernicke 1874 and Broadbent, W.H. 1879.

(339) First described in English in 1877. The original, in German, is Spamer 1876.

(340) Baginsky 1871:441, Figure 15.

(341) Spamer 1877:404. Cf. also Kussmaul 1878:780, Lichtheim 1884-85:207, 1885:436.

(342) Ross 1886h:360.

(343) Shaw, E.A. 1893:512.

(344) Broadbent, W.H. 1878a:148-149; 1879:494.

(345) Broadbent, W.H. 1878a:147-148.

(346) Broadbent, W.H. 1879:494.

(347) See above, sub-section 4.6.3.

(348) Cf. Spamer 1877:404 where the German word 'Verständnis' (comprehension) is translated as 'intelligence'.

(349) McCosh 1886:201.

(350) Ross 1886k:108-110.

(351) Bastian 1887b:932. See also above, sub-section 4.9.4.2.

(352) Cf. above, sub-section 4.8.11.3.

(353) Cf. Jackson's views on this topic, Chapter 5, sub-sections 5.6.3 and 5.6.5.

(354) Jackson, J.H. 1870a:460. See also Chapter 5, sub-section 5.4.6.

(355) Ross 1886g:277.

(356) Staubback & de Watteville 1886:753. See also Appendix C, sub-section C.2.2.

(357) Ord 1873:55.

(358) Jackson, J.H. 1864c:572.

(359) Russell, J. 1864a:241.

(360) Op.cit.:211-212.

(361) Op.cit.:240.

(362) In three parts, in July and August 1864.

(363) Jackson, J.H. 1864d:167.

(364) In 1866, Fox had reported, without comment, a case of left hemiplegia in which speech-comprehension, but not speech production, had been disturbed (Fox 1866:146).

(365) See his Cases 1, 2, 6, 14, 15, 17, 18, 21 in Ogle, J.W. 1868a. He does not refer directly to Russell, however.

(366) Op.cit.:371.

(367) Wadham 1869:246.

(368) Popham 1867:21.

(369) Peacock 1867:460 [Case 2].

(370) Jackson, J.H. 1867-68:372-373 [Case XX] The difficulty here is knowing what sort of a linguistic defect the patient was suffering from. The implication (on p. 372) is that her speech-comprehension was unaffected; but this would still allow for the possibility of either a 'mental' or a 'mechanical' disturbance of the speech production process. Cf. also Jackson, J.H. 1868a:316, in which a further case of left hemiplegia with "aphasia" ('defect of intellectual expression') is briefly reported.

(371) Bruce 1868:87-88.

(372) Jackson was aware of this. Cf. Chapter 5, sub-section 5.5.5 and note (87).

(373) See, for example, Heberden 1806:348.

(374) Gairdner 1865-68a:105.

(375) Bateman 1869b:112-114.

(376) Dowe 1873.

(377) Charcot 1881:364.

(378) Bristowe 1876:944-945.

(379) Ferrier, D. 1878:517; Ross 1881b:626.

(380) Kussmaul 1878:612. The term was actually the German 'Anarthrie'. It was used first by Ernst Leyden (1832-1910), professor of clinical medicine at Königsberg, and it was he who proposed a terminology for the distinction that James Russell had in effect made (although Leyden was probably unaware of Russell's work) between the 'mental' and 'mechanical' aspects of "aphasia". In 1867, he defined 'Anarthrie' (as distinct from 'Aphasie') as a disturbance of articulation due to incomplete control of the requisite muscles: 'Sie unterscheidet sich von der Aphasie wesentlich dadurch, dass die Articulation der Sprache durch unvollkommene Leistung der betreffenden Muskeln ziemlich gleichmässig für alle Worte und Laute behindert ist, während die Zeichensprache, das Verständnis der Worte, das Wortgedächtniss, sowie das Sensorium überhaupt in den nicht complicirten Fällen vollkommen intact ist'(Leyden 1867:78). A further distinguishing feature is that the locus

of the damage is possibly in the region of the nerve nuclei. (Op.cit.:79.)

The term itself was devised for Leyden by a 'Herr Tobias'. This is probably Wilhelm Tobias (b.1835), whose dissertation at Berlin had been on a neurological topic: see Billings 1918-1932:631. No notice was taken of Leyden's term in the British literature until 1878 and the publication of Kussmaul (1878).

In an obituary of Leyden, the Lancet made no mention of his work on speech pathology (Lancet ii, 1910:1252). The obituary in the Deutsche Medizinische Wochenschrift (36, 1910:2055-2061) mentions his work on 'centrale Sprachstörungen', but does not specifically draw attention to his introduction of the term 'Anarthrie'. He is mentioned only once in the British literature on speech pathology, in Kussmaul (1878:651).

(381) Bristowe 1870a:300.

(382) Tamburini 1877:632.

(383) Gallopain 1878:139.

(384) Gowers 1888:102. Cf. also Bastian 1875:183.

(385) Suckling 1887:89.

(386) Kussmaul 1878:748.

(387) Op.cit.:612.

(388) See Chapter 2, sub-section 2.4.5. The first reference to Wernicke is not until Kussmaul (1878:773). Thereafter, he is never mentioned, except by Ross (1883:314) and, fleetingly, by Anon. (1886:1026) and Starr (1888:464). He is referred to in these two last examples as 'Werneck' and 'Wernick' respectively.

(389) Dale 1878:454; MacCormac 1878:257; Boyd 1881:705 [Case 2]; Broadbent, W.H. 1884:253-54; Flynn 1885:1155; Bramwell, H.R. 1886:398; Bramwell, B. 1888:237 [Case 2].

(390) Broadbent, W.H. 1878a:150-151.

(391) Bramwell, B. 1888:228-229.

(392) Weekes 1881:707.

(393) Jacob 1880:365; Fraser & Gairdner 1882:704 [Case 1]; Schofield 1884:386; West, S. 1885:157; Turner, J. 1885:700; Suckling 1885:918; Suckling 1886:691 [Cases 1 & 2] (= Suckling 1887a:89-92); Fraser 1887:302; Bennett 1888:340 [Case 2]; Bradshaw 1888:1413 [Case 1]; Reynolds, E.S. 1891:1150; Mills, C.K. 1891:468; Reynolds, E.S. 1893:101 [Case 3]; Tomkins 1894:907.

(394) West, S. 1885:157; Turner, J. 1885:700.

(395) Fraser 1887:303 (= 1892:70).

(396) Mills, C.K. 1891:469-472.

(397) The area served by the posterior branches of the left MCA is assumed, without the benefit of actual post-mortem evidence, to be the source of the disturbance (Suckling 1885:918; Suckling 1886:691; Tomkins 1894:908). Reynolds, E.S. (1891: 1151) posits the superior temporal as the area, but without adducing any post-mortem data.

(398) Reynolds, E.S. 1893:101 [Case 3].

(399) Kussmaul 1878:692.

(400) Lichtheim 1885:483.

(401) Ross 1886e:110.

(402) In the reprint (Ross 1887:65) this error is repeated.

(403) Ladd 1887:296.

(404) Starr 1889.

(405) Op.cit.: Cases 2 and 22.

(406) Op.cit.: Cases 36 and 47.

(407) Op.cit.: Cases 11 and 35.

(408) Shaw, E.A. 1893:502.

(409) See Chapter 2, sub-section 2.4.4.

(410) Ogle, W. 1867b. He was allegedly the first to use the term (in English) - the entry in the OED is incorrect (OEDc:47) - but he was not to know that it had been in existence before: see Bateman 1890:206.

(411) Gairdner 1865-1868: Plate 11; Bristowe 1871b: Plate; Jackson, J.H. 1874b:574; Dale 1878:454; Savage 1878:527; Bramwell, B. 1888:229; Francis 1888:12-13; Waldo 1894:15.

(412) See Appendix C, sub-section C.1.1.

(413) Cf. Ross 1886e:106.

(414) See, for example, Bastian 1887b:933.

(415) Giampietro 1893:77.

(416) Wyllie 1894:315-318.

(417) Ladd 1887:294.

(418) Further references to agraphia, additional to those listed in note (411), can be found in Welby 1864:34; Banks 1865:74; Moore, W.D. 1865:254; Russell, J. 1865:283; Jackson, J.H. 1866d:93; Trousseau 1866:268-269; Ogle, W. 1867b:83-122; Fayrer 1869:236; Spectator 1874:74; Shaw, T.C. 1874:574; Kussmaul 1878:751-756; Marandon de Montyel 1879:666; Ross 1881a:904; Chauffard 1881:654; Copland 1883:896; Ross 1886e:106; Cremen 1886:15; Pope & Godlee 1886:1159; Ladd 1887:294; Smith, P.B. 1889:81-82; Tooth 1889:51; Dobie 1892:85; Ord & Shattock 1894:12; Tomkins 1894:908; Wyllie 1894:266 et passim.

(419) See, for example, Moore, W.D. 1865:254; Glynn 1890:168; Reynolds, E.S. 1891:1151.

(420) Kussmaul 1878:775.

(421) Charcot 1889:1333.

(422) Charcot 1883:45.

(423) Bastian 1887b:933.

(424) Hollander 1891:227.

(425) Cf. Ross 1886g:282; Wyllie 1894:272-273. The terms derived from Kussmaul 1878:756, 790.

(426) Chapter 2, sub-section 2.4.10.

(427) Jackson, J.H. 1871c:430.

(428) Bacon 1871:488.

(429) Kast 1886:878.

(430) See below, pp. 377 and 383 and Kussmaul 1878:613, 719; Ross 1886f:190, 1886g:283.

(431) Sanders 1865-1866a.

(432) Trousseau's Lectures on Clinical Medicine (1866) containing some remarks on Bouillaud, was published early in 1866; cf. the review in the Lancet on 31 March 1866 and sub-section 4.8.1 above. It contains, however, nothing that could have provided Sanders with the distinction between two types of aphasia.

(433) Gairdner 1865-68:105. See also sub-section 4.10.3.

(434) It has not been possible to trace the source of this scheme attributed by Anderson to a publication by Baillarger in 1863 supposedly. It would seem that Baillarger's first contribution to "aphasia" theory was not in fact until 1865, with his paper on a psychological view-point of "aphasia" (Baillarger 1865). This, however, contains the essential points made by Anderson.

(435) Anderson, J.K. 1866:376.

(436) Popham 1867. In the meantime there had been absolutely no reaction in the medical literature to either of these schemata.

(437) The term is not listed in the OED. Popham (if he invented it) very probably based it on the Greek root ληθ- (from which LETHARGY is derived).

(438) Op.cit.:4-5.

(439) Op.cit.:13.

(440) Cf. Anderson's definition in sub-section 4.13.2.2 above.

(441) Bateman 1867:420.

(442) Ogle, W. 1867b:94. Fox (1874:222) uses 'amnemonic' but defines it as 'the loss of memory of words'.

(442a) Op.cit.:96.

(443) Jackson, J.H. 1868c:275. Cf. also 1868d and the discussion in Chapter 5, sub-section 5.5.4.

(444) Bastian 1869b:211.

(445) Dunglison 1874:69-70.

(446) Jaccoud 1875:366.

(447) Bristowe 1876:944-949.

(448) The only change he made was to head the section (in 1890) 'Paralytic affections of speech ...' whereas in 1876 it had been 'Impairment of loss of power of speech ...'.

(449) '... the formation of thought is disturbed' (Kussmaul 1878: 613).

(450) Loc.cit.

(451) Op.cit.:748. Hughlings Jackson had made precisely the same point in 1873. See Jackson, J.H. 1873b:187, and the comments on dysarthria, sub-section 4.10.1.

(452) Op.cit.:612.

(453) Op.cit.:613

(454) Op.cit.:747.

(455) Op.cit.:612.

(456) Aitken 1880:486-487.

(457) Power & Sedgwick 1881-1899:I, n.p.

(458) Bastian 1882a:69.

(459) Op.cit.:70.

(460) Bastian 1882b:1448.

(461) Gairdner 1883:311.

(462) Cf. Kussmaul 1878:783.

(463) Ross 1883:314.

(464) Ross 1884:511.

(465) Stewart 1884b:195. Cf. also Ranney 1881:32.

(466) One sees here the beginning of the tradition that the 'a-' prefix should be used to refer to complete loss, leaving 'dys-' for partial loss.

(467) 11 1885:487-488, Cautley 1889:263, Beevor 1890:60.

(468) Lichtheim 1885. There is actually an eighth, 'total aphasia', but this he would include with a number of other possible types, all combinations of single types, some of which are predicted by the model but had thus far not appeared as clinical forms of aphasia.

(469) Op.cit.:438, 439, 442, 447, 449, 453, 460.

(470)

	English (1885:476)	German (1884-1885:256)
1.	central aphasia	Kernaphasie
2.	word-deafness	Kernsprachtaubheit
3.	commissural paraphasia >insular aphasia	Leitungsparaphasie > Inselaphasie
4.	inner commissural aphasia	centrale Leitungsaphasie
5.	outer commissural aphasia	periphere Leitungsaphasie
6.	word-deafness	Leitungssprachtaubheit
7.	-	-

Another confusing feature of the translation is that on p.476 (second paragraph lines 6 and 7) 'or' is used incorrectly instead of 'and': 'central aphasia or word-deafness' and '(inner and outer) commissural aphasia or word-deafness' should read 'central aphasia and word-deafness' and '(inner and outer) commissural aphasia and word-deafness'.

(471) Ross 1886g:270.

(472) Op.cit.:269.

(473) Westbrook 1890:685-686.

(474) Wyllie 1894:passim.

(475) Cf. Banks 1865:79 [Case 2]; Gairdner 1865-68a:102-103; Trousseau 1866:237; Ogle, J.W. 1870: Case 29 ; Bastian 1875:198; Stewart 1884:189; TT 1885:487; Ross 1886f:186, 1886g:272, 276.

(476) The patient was not one of Gairdner's.

(477) See Gairdner 1865-1868:115; Anderson, J.K. 1866:381; Robertson, A. 1867b:137; Maudsley 1868:723.

(478) Banks 1865:79. See also Robertson, A. 1867a:504-507. Fayrer (1866c:423) quoted a case in which the patient's 'intelligence' was 'perfect'. Since he had 'thick articulation', this may well have been a case of dysarthria, not aphasia.

(479) Cf. MacCormac 1878:260; Mallins 1883:895; Wahltuch 1884:511; TT 1885:487.

(480) Cf. Critchley 1970:288-295.

(481) Gairdner 1862.

(482) Banks 1865:78.

(483) Br.Med.J. ii, 1877:386; O'Neill 1877.

(484) Bateman 1883:316; Br.Med.J. i, 1886:1026; Bateman 1890:300-314.

(485) Cf. the examples of traumatic "aphasia" in Chapter 2, note (38,A1).

(486) Casper 1865:31 [Case CXVIII].

(487) See the statistics in sub-section 4.4.1.

(488) Sumpter (1868, 1869a,b) and Cameron (1883) deal briefly with cases of familial 'aphasia', but do not go into sufficient detail for one to be able to draw any firm conclusions about hereditary predispositions towards 'aphasia'.

(489) Ireland 1883:314.

(490) Archer 1885:195.

(491) Cf. Appendix C, sub-section 2.3.7.

(492) Moxon 1866:487-488.

(493) Some years afterwards, the French psychologist Ribot enunciated what has since become known as 'Ribot's Law': 'The evolution of language takes place ... in an inverse order to that of its dissolution in aphasia' (Ribot 1882:168). 'Evolution' refers not to the acquisition of language in young children but to the gradual diachronic changes in 'adult' languages. It is surprising, especially in view of Jackson's (ultimately Spencer's) theory of dissolution in aphasia, that this thesis of Ribot's was never once remarked upon in the medical literature on aphasia. Had it been, one might have seen a degree of cooperation developing between linguists and clinicians in the analysis of aphasic speech.

CHAPTER 5

JOHN HUGHLINGS JACKSON AS A THEORETICIAN OF NEUROLINGUISTICS

NOTES FOR CHAPTER 5 ARE BETWEEN

PAGES 483 AND 491

5.1 Introduction

Jackson is held to have been one of the foremost British neurologists of the 19th and early 20th centuries, whose influence, some 70 years after his death, continues to be felt in the field of neurology. His colleague and fellow-student of aphasia, Sir William Broadbent, summed up his achievements, in 1903, by saying that he was not only a diligent and careful collator of clinical data, but also a person with the ability to 'comprehend the underlying significance of phenomena'.(1) For an understanding of his work in the domain of speech pathology, this latter remark is pivotal.

In Jackson's day, little critical assessment of his work on aphasia was forthcoming. Aigré, writing for a foreign audience, provided an intentionally descriptive and non-controversial summary of a selection of his papers on the subject published between 1871 and 1875.(2) Likewise, Sully précised Jackson's lengthy and important work on affections of speech, which appeared between 1878 and 1880.(3) A few years after his death (in 1911), Head republished some of Jackson's papers, summarising their main contents and adding a valuable introduction.(4) It was in the latter that Head suggested some reasons why Jackson's work had fallen into comparative neglect, even during his lifetime. He attributed it to the man's personal modesty, his sometimes convoluted literary style,which at times could make his work difficult to understand, his adherence to the views and terminology of Herbert Spencer, and lastly - and perhaps most importantly - the fact that in his thinking about language and language disorders he was out of step with the opinions that prevailed amongst many of his British and foreign colleagues.(5)

It is only within the last 25 years that an overt revival of interest in Jackson's work on aphasia has taken place amongst clinicians and historians of medicine. Considerable efforts have been made to try to elucidate the sources of his ideas.(6) Greenblatt, in a series of works, has devoted considerable space to a detailed exposition of Jackson's early years as an aphasiologist. Unfortunately, this covers only the first three years of Jackson's work in this field, between 1864 and 1866; Jackson continued to publish on aphasia for another 27 years!(7) Only Engelhardt has made what might be called a critical study of one aspect of Jackson's work in neurology, namely the background to his ideas on the doctrine of concomitance.(8)

5.2 Aim of this Chapter

The aim of this Chapter is, from a close reading of all of Jackson's work relating to "language" disorders, to describe and discuss the development of his ideas and to show to what extent they constituted a neurolinguistic theory. Other commentators, for example Head and Riese, have treated them as they were immutable; this is not so.(9) It will be shown too that unlike some, even most, of his contemporaries, Jackson recognized the futility of attempting to describe, let alone explain, speech disorders without first establishing a theoretical framework which was not only appropriate but also rigorous.

The discussion has been arranged both thematically and chronologically, the latter in order to reveal the changes that Jackson's views underwent during the course of thirty years' work. Considerable attention will be paid to what may be called his neurolinguistic

theory. This encompassed such topics as the nature of speech and the neuropsychological processes of speech and speech-comprehension, the delimitation of normal and aphasic speech, the use of linguistic concepts in the formulation of a theory of aphasia and in the description of aphasic data, the neural bases of speech, and the classification of speech disorders.

5.3 An overview of Jackson's work in speech pathology

Jackson's interest in speech disorders extended, as far as his published work was concerned, over thirty years of his life, from 1864 to 1893. It resulted in the publication of more than forty papers dealing specifically with speech disorders; many more touched on the subject *en passant*.(10) Some were short, single-page case-reports; others lengthier and more theoretically-oriented expositions of his neurolinguistic views. One work, 'On affections of speech from disease of the brain', ran to 78 pages in the first two volumes of *Brain*.(11)

During the course of these thirty years he observed hundreds of cases of speech disorders, many of them in the wards of the London Hospital, others at the suggestion of colleagues in other hospitals or private practices. Not unnaturally, the great majority were cases of aphasia and/or allied conditions. Although he was aware of the problems in making a differential diagnosis between aphasia, deafness and various psychogenic speech disorders (e.g. hysterical mutism), he never apparently ventured far into this wider field. There is no mention

anywhere, for example, of his views on the neurolinguistics of stammering - he may never have had occasion to examine a stammerer.

His work falls into four main periods: (i) the case-reports and early theory, 1864-1867; (ii) the exposition of two classificatory types of aphasia, 1868; (iii) the paper 'On the nature of the duality of the brain' (1874) dealing in more theoretical terms than previously with the nature of language and the characteristics of aphasia; and (iv) the long, final summary of some of his views, 1878-1880. None of these periods can be regarded as being thematically distinct from any of the others: ideas in one either fail to re-appear in another, or if they do, are developed, but sometimes in a different direction from before. However, in order to provide a manageable framework for the discussion of the material, the policy of working within these four, broad chronological periods has been adopted. In addition, Jackson's views on the nature of language and on the neurology of language have been separated from his views on aphasia itself, as much to show that he was able to consider the three topics in isolation from one another as to make the exposition somewhat easier to follow.

Examples of the types of cases he dealt with - at least in the early years - may be found in his résumé of the 16 cases of speech disorder out of the 30 neurological cases he reported on during 1867-1868.(12) The defects ranged from a case of articulatory and phonatory difficulties arising from paralysis of the left side of the tongue, palate and the left vocal fold(13) to cases of greater linguistic severity. These included temporary loss of speech, ataxy of articulation, a 'great defect of articulation', word-finding difficulties,

incomplete sentences, total expressive aphasia and a mixture of symptoms - problems of articulation, writing, memory, word confusion, and agraphia with expressive aphasia.(14)

Further cases which he reported indicate some of the other, more problematical types of aphasia he was confronted with. In two reports, he recounted instances of transient aphasia.(15) In another report, a man was reported as having survived five strokes, leading on all five occasions to a shortlived left hemiplegia and a transient aphasia.(16)

Not all of the cases he saw could be explained readily in terms of his own ideas on the nature of brain functions. Thus, his last published case-report of aphasia in 1886 (but not his final word on the subject) described a fairly complicated case in which symptoms of speech disorder accompanied other symptoms resulting from brain damage, including a functional disturbance in the left eye and left shoulder. For all of these symptoms Jackson could offer no cogent explanation in the light of current medical knowledge.

Prior to 1864, Jackson had apparently shown little clinical interest in speech disorders; his publications since 1861 had concentrated on epilepsy and syphilis. He had, however, as a schoolboy and later as a young house officer at the York Dispensary between 1857 and 1859, witnessed a number of cases of speech disorders.(17) The reason for what can only be described as the sudden and massive burgeoning of interest in the subject - no publications before 1864 but eight that year including case-discussions and some theorizing

about 70 patients in all[18] - is that the study of speech disorders had become the next logical step in his clinical understanding of hemiplegia. As he himself put it, it was the 'strangeness of the association' between the physical defect of unilateral hemiplegia and the mental defect of speech disturbance that caused him to begin paying attention to the latter in order 'to seek for some explanation of the concurrence of the two symptoms'.[19] A connection could be established between the causes of epilepsy and hemiplegia; a possible answer to the question of the connection between hemiplegia and speech disorder was the close proximity of the 'seat of the faculty of language,' or of articulate language' and the corpus striatum, 'the upper part of the motor tract'.[20] On his own admission, then, it was his work on hemiplegia which drew him to the study of language. There is no extant evidence to suggest that he was naturally interested either in language per se or in learning foreign languages - and this despite the way in which the whole subject of linguistics had been dramatically brought to the general public's attention by Max Müller's lectures on the subject. In any case, attempts to discover the real reasons for Jackson's non-medical and some of his medical interests are fraught with difficulty owing to the absence of his Nachlass. This constitutes a major lacuna in studies of his work.[21]

5.4 Jackson's philosophy of language

5.4.1 'Speech' and 'talking'

There is clear evidence that from the very beginnings of his studies of speech disorders Jackson was well aware of the theoretical limitations of the currently accepted views of the subject, deriving

from the absence of any consciously formulated theory of language. For example, in January of 1864, in his first paper (1864a), he remarked that 'neither the word "speech" nor the word "language" would do for all cases' he had seen.(22) By November, he had concluded that no word could 'define defects which differ so widely from one another'.(23) His solution was either to discard or else carefully define metalinguistically the traditional terminology; or, where appropriate, introduce completely new terms of his own. One should note, however, that he continued to use the more instantly recognizable expressions such as 'loss of speech', 'defect of speech', 'difficulty in talking' in the titles of his papers, together with more esoteric forms such as 'epileptic aphemia', even though the actual characteristics of a case of 'defect of speech' may not have coincided precisely with the concept as defined metalinguistically. Furthermore, Jackson did not, of his own accord, discover the need to employ traditional terms in suitably defined ways: as he admits, it was actually Brown-Séquard who taught him to distinguish between 'defects of language, speech, articulation, etc.'.(24)

In his first paper, he drew a basic distinction between two forms of communication: 'speech' and 'talking' (a synonym for the latter is 'power of articulation'). From the point of view of abnormal functioning, then, there could be a 'defect of speech' which was quite different from a 'defect of talking'. 'Speech' remained undefined, but 'talking' consisted, he said, of 'articulation', 'speech for words' and 'language for the expression of ideas'.(25) The inevitable confusion in this scheme between 'speech' on the one hand and 'speech

for words' on the other is glaringly obvious. Furthermore, as reference to Figure 30 will show, additional confusion was introduced later that year when, in 1864b, 'speech', now a sub-set of 'talking', was distinguished from another 'speech', defined as 'the expression of ideas'.(26) In the 1864a scheme, this would have made it equivalent to 'Language for the expression of ideas'!

Taking into account his remarks in 1864c, the only firm conclusion one can draw from these shifts in terminology is that Jackson's concept of communication required that there should be a fundamental distinction between the 'power' to the articulators and a higher level factor. This interpretation is, I believe, confirmed by his comment the following year that 'what may appear to be a mere defect of articulation is often due to disease of parts far above the ninth nerve or its muscles'.(27) In any case, such a distinction was, as indicated in Chapter 4, one that had already been broached, if not tightly formulated, in the work of other clinicians, for example James Russell.

5.4.2 'Expression'

His experiences of trying to describe aphasic disorders in terms of more traditional concepts, together with the effect that Broca's ideas had had on him,(28) led Jackson, in late 1864, to set out something of his own ideas on what constituted verbal communication.(29) For this purpose, he introduced the word 'Expression', which he contrasted with 'Talking'. The former can be identified only approximately with his earlier term ' Speech'. 'Expression' includes 'Speech' as well as other aspects of communication, namely writing and

Figure 30

JACKSON'S CATEGORIES OF COMMUNICATION

1. 1864a:123 — Speech ≠ Talking (or Power of Articulation)
   - Articulation
   - Speech for words
   - Language for the expression of ideas

2. 1864f:604 — Expression (or General faculty of language) ≠ Talking
   - Utterance
   - Writing
   - Making signs

3. 1864h:364 & 1878-1879:310 — Speech ≠ Talking
   - Articulation (= the utterance of words)
   - Voice (= sound, as in singing)
   - Speech (= the expression of ideas)

4. 1866a:175 — Language
   - Intellectual language
   - Emotional language

gesture. Thus, in cases of 'defective power of expression', three different symptoms are present: 'defective utterance', secondly, a disturbance of the ability to write, and, thirdly, a difficulty in 'mak[ing] signs', that is, of gesture. For the moment at least, 'Expression' involved only expressive modalities; later, some receptive modalities were to be introduced into the concept.

It was pointed out in Chapter 2 that Steele had used the same word 'expression' in describing "aphasia";(30) it is possible, then, that Jackson may well have taken it over from Steele. On the other hand, the synonym that he gives for it, 'the general faculty of language' indicates the influence of Broca's ideas.

5.4.3 'Intellectual language' and 'emotional language'

Up until 1866, it seemed that Jackson was satisfied both with the distinctions he had drawn between different aspects of communication and the nomenclature he had proposed. Then, in the papers published in 1866, one finds a more philosophical tone as he tried to extend his basic framework. For one thing, he had somehow to account for the ability of an otherwise 'speechless' patient, that is an aphasic, to utter words, albeit oaths, under conditions of emotional excitement or when singing.(31) His opinions, though couched in somewhat mystical terms, indicate that certain ideas from the works of Spencer, Max Müller and Latham were beginning to exert an influence over his thinking. Thus, he explains the swearing and singing on the grounds that, according to Spencer, 'All speech [consists of] two elements: the words and the tones in which they are uttered - the signs of ideas and the signs of emotion'.(32)

A similar view, though less trenchantly expressed, was held by Max Müller: '... language begins where interjections end'; Jackson quoted this in confirmation of Spencer's opinion. He was led, therefore, to make a distinction between two sorts of 'language' (the word 'Expression' had now been abandoned): 'intellectual language' and 'emotional language'.(33) The aphasic who swears would, therefore, be described as having 'emotional' but not 'intellectual language'. Such a characterization marks a shift in Jackson's thinking on the subject, for in the 1864h paper he had maintained that swearing was 'strictly speaking not part of language ... [but] the impulse to add the force of passing emotions to the expression of ideas'.(34)

5.4.4 'Propositions' and 'words'

In the same paper (1866a) in which he had introduced formally the concept of two 'languages', he had also used the word 'propositions'. He had quoted Latham's sentence that 'Without propositions there are no questions, commands or declarations ... without questions there would scarcely be such a thing as language'.(35) The 'proposition' was clearly a fundamental constituent of 'intellectual language', but what did Jackson intend by it? In 1868c he used it again - or at least the same concept - when he said that speech consisted not only of the 'utterance of words' but also of 'propositionizing'.(36) In his paper on the duality of the brain (1874a) he had more to say about propositions. They are used, he says, in two distinct ways: for speaking ('making propositions', 'voluntary speech') and for understanding ('receiving propositions', 'automatic revival of words').(37) It is only in his long 1878-1880 paper, however, that he at last defines it, as 'such a relation of words that it makes one new

meaning'.(38) He elaborates on the feature of meaning, when he says that 'single words are meaningless, and so is any unrelated succession of words'. Only when a sequence of words is used in a proposition does it become meaningful - indeed, the 'unit of speech is the proposition'.(39)

Much has been written about Jackson's use of the term 'proposition'.(40) Nevertheless, it would seem to have been for him, whatever its origins or its status in contemporary logic, no more than a synonym for a meaningful stretch of speech. I base this interpretation on the fact that Jackson, having stated that 'Gold is yellow' is a proposition, but that oaths are 'dead propositions',(41) points out elsewhere in the same paper that a patient may produce an 'elaborate utterance' which nevertheless appears to be devoid of any meaning.(42) A further characteristic of the proposition, in view of the contrast Jackson draws between utterances that are 'propositional in structure' but not necessarily 'propositional in use',(43) is that it should not only be meaningful but also grammatically correct.

There is a certain illogicality in his argument about the status of the proposition as the 'unit of speech': how does one account for the major role that he attributes to words, particularly since without them there would be no propositions? The only reasonable explanation, I believe, is that Jackson was simply not aware of the apparent contradiction.

Returning to his 1874a paper, one finds a distinction drawn there between two sorts of proposition: 'subject-proposition' and 'object-proposition'. The terms themselves are taken directly from

Spencer's Principles of Psychology,(44) and refer respectively to what Jackson describes, rather inelegantly, as 'the "survival of the fittest" words in fittest relation during activity beginning in the right half of the brain' in which 'an internal relation of two images' is symbolized, as well as to 'the [symbolization] of the relations of these two images as for things in the environment'.(45) The essence of the distinction would seem to be that certain mental activity must take place, involving the arousal of words ('subject-proposition'),before the cerebral processes (in the left hemisphere) are activated ('object-proposition'). At this point one notes that the formerly clear contrast between 'words' and 'propositions' is becoming obscured. Words, he says, are 'only symbols of things or of "images" of things', which 'may be said to have meaning "behind them"'.(46) By this definition, words are not chunks of meaning, but linguistic forms that mirror meaning: in effect they are grammatical, not semantic elements.

The concept of the proposition is extended further, in his last paper on aphasia (1893). He maintains that propositions are composed not simply of words, but, more abstractly, of 'symbols'; the latter can be verbal or pantomimic in nature.(47) The 'word' is still, however, the basic unit of linguistic activities: corresponding to it in physical terms is 'a discharge of cerebral nervous arrangements representing articulatory muscles in a particular movement, or, if there be several syllables, in a series of particular movements'.(48) This latter qualification might even be read as an indication that, by 1893, the syllable was regarded as the basic unit of speech production, regardless of its place in a more abstract representation of the processes which lead to the firing of motor-units.

5.4.5 'Degrees of utterances'

In the 1878-1880 paper he sets up what he calls three 'degrees of utterances'.(49) These correspond to styles of speech. The first is 'Not speech', and includes 'nasty words used by vulgar people when excited', forms with 'no intellectual meaning' and 'ejaculations in general'. Clearly, he is referring to expletives, although, on grounds on social propriety, he refrains from mentioning, let alone discussing, other expressions in this category, words connected with 'religious commination'. His second 'degree' is 'inferior speech', consisting of the limited range of expressions used when addressing horses.(50)

However, the otherwise well defined distinction between this and the first 'degree' ('Not speech') is blurred in a later paragraph of the paper when he says that 'strong emotion leads to Inferior Speech, to more automatic, more organised utterance'.(51) The examples he quotes show that the term 'Inferior Speech' is now being used as the term for the first as well as the second 'degree'. His third category he calls 'Real Speech' or 'High Speech' or 'Superior Speech'. This is 'not simply an affair of number of words, nor simply of complexity of their arrangements' but 'accurate speech on complex matters' involving 'precision of application to new relations of things'.(52) In more modern terminology, 'Real Speech' is contextually-bound meaningful utterances.

5.4.6 Abnormalities in normal speech and writing

As described in Chapter 4,(53) Jackson was aware of the existence of slips of the tongue and slips of the pen. The only other remark he makes about quasi-"aphasic" symptoms occurring in otherwise normal persons is that when intoxicated, a person may resemble, in his speech, someone suffering from a particular form of brain-damage.(54)

What he had in mind was undoubtedly the typical speech-patterns of a dysarthric. What is perhaps more important, however, is that he says nothing about hesitations and other forms of non-fluent speech which are found in most normal speakers and in certain forms of aphasia.

5.4.7 The role of linguistics and phonetics in Jackson's philosophy of language

Thus far we have seen how Jackson's whole approach to the concept of language and, by implication, that of disordered language in aphasia, was based on a small number of concepts. The normal person organizes his ideas into the form of propositions and these, as 'intellectual language', are expressed as words or as writing. The non-intellectual aspects he regards as being 'emotional language'. Cutting across this distinction are his three 'degrees of utterances', 'Not speech' being a type of 'emotional language' and 'Real Speech' of 'intellectual language'. He notes also the occurrence of certain quasi-"aphasic" forms in normal speakers under certain specific conditions. What use does he make, then, of what, in the discussion in Chapter 4 of the work of his contemporaries, were described as 'phonetic' and 'grammatical' principles? The answer is practically none. In fact, he nowhere resorts to a 'parts of speech' analysis or any other formal type of analysis of his patients' speech; nor does he employ any of the more technical terminology of phonetics. Whether this reflected a lack of expertise on his part in this area is not known. There are, in any case, very few references to contemporary studies in linguistics and phonetics in his entire published output. In the 1878-1880 paper he noted that the philological history of a word is immaterial from the point of view of interpreting its function in an aphasic's speech.(55)

Elsewhere he quoted a remark by Tylor, the anthropologist, about the use of 'tone' in certain exotic languages. Unfortunately, he misunderstood Tylor's intention![56]

On the other hand, he had recourse to some of the well-established vocabulary of language-analysis when he summarized a patient's speech problems: 'spoke mostly monosyllables', 'he made mistakes in words', '... could say ... a few other short sentences', 'her voice ran up and down', 'she altered words, but pronounced the real or fictitious syllables of them pretty well', '... disjointed noises [rather] than articulate sounds'.[57] In all other cases, he either quotes actual examples verbatim, such as 'He said "Yes," when he meant "No", and "Aye" when "Yes"',[58] or else, when describing particularly severe forms of aphasia, uses suitably generalized terminology: '... could not tell me anything by words, signs or grimaces', 'generally too unintelligible', 'continuously repeated jargon', 'confused talking', 'speechless'.[59]

It may be thought slightly ironic that Jackson was able to work out, to his own satisfaction at least, a theory of language and (as we shall see) aphasic disorders, which involved using only a minimum of the formal apparatus of linguistic theory - especially in the light of today's insistence that linguistics has a major role to play in the investigation of aphasia. He appreciated that the word was of fundamental importance in a theory of language, and that words conveyed meaning. With essentially little more than this of a strictly linguistic nature, he was able to devise a theoretical structure with which to explain aphasia. This has, in certain respects, withstood

the developments of alternative, more consciously linguistically motivated accounts. Evidence that within the field of linguistics itself Jackson's views were (and are) considered to be of some significance is, firstly, that J.R. Firth thought highly of his work and recommended his post-graduate students of linguistics, in London in the 1930s, to familiarize themselves with it,(60) and, secondly, that Roman Jakobson has often drawn the attention of linguists as well as of those working in aphasiology to Jackson's work.(61) In Jakobson's opinion, Jackson may be considered to be one of the 'precursors of the science of language'.

5.5 Jackson's theories of aphasia

We have seen that during 1864 Jackson developed his ideas about the nature of language in terms of such concepts as 'speech', 'talking' and 'expression'. Paralleling this, but always directly relatable to it, was the view he began to develop about the nature of disordered language, that is, of aphasia. In the first of his papers (1864a), he remarked that the general subject of speech disorders was 'far too obscure to induce' him 'to dogmatize'.(62) Thereafter, in the following months, he gradually worked his way forward to a more intellectually satisfying explanation of the various conditions. The only influence, as far as can be judged, on his thinking at this time was that of Broca. Even so, the years 1864-1866 were ones in which Jackson could only partially accept the validity of Broca's point of view; as time went by, he gradually found himself more and more at variance with him. Yet, despite differences of opinion on certain crucial matters, he continued to hold Broca in high regard, later describing his work as having constituted 'memorable researches'.(63)

5.5.1 The influence of Broca

The term 'aphasia' is used by Jackson for the first time in his 1864c paper[64] where it is defined as a 'more or less complete loss of the power of speech'.[65] At the same time he mentions 'faculty of speech' as used by Broca, but does not equate it with his own term 'speech'. An observant reader and especially one familiar with the original French texts of Broca's papers, can only have been confused by the way in which Jackson was using these various terms. To add to the possible confusion, in the same paper (1864c) Jackson uses the term 'language' when he must, given the form of his theory of language as developed so far, have meant 'speech': 'the dumbness was a loss of power of articulation rather than of language'.[66]

Further evidence of the influence of Broca's views is to be seen in the synonym that Jackson gives for his own concept of 'expression': he calls it the 'general faculty of language'. At the same time he uses Broca's concept of aphemia but describes it merely as a 'defect of articulate language' in which there is a 'difficulty in uttering words'.[67] Slightly later (1864h), this is clarified when a defect of articulate language is described as 'a kind of ataxy of articulation', which, in turn, is defined as an 'inability to combine muscular movements in a particular mental act ... a defect in the executive of articulation ... quite different from the slipshod talk in paralysis of the tongue, &, which is due to a mere paralysis of the muscles themselves'.[68] This, then, would make his 'defect of articulate language' close to, if not identical in meaning with Broca's aphemia as well as to what nowadays would be described as articulatory dyspraxia. That Jackson's term and Broca's may not be identical is

shown by the fact that Jackson locates the defect in the 'executive of articulation'; Broca was more precise and, as we have seen already, defined it as a defect in coordinating the necessary movements for articulation. On another occasion, however, he used Broca's term 'aphemia' and defined it as a 'loss of the faculty of articulate language'.(69) What he was not taking into account, however, was that Broca had specified a particular meaning for the term 'faculty of articulate language', which his own description failed to capture. And in the very next paper (1864e), published at the same time as 1864d, an unnecessary obscurity enters into his exposition: aphemia, a 'loss of articulate language' is said not to be the same as a 'loss of language'.(70) He was presumably trying to explain Broca's distinction between 'la faculté du langage articulé' and 'la faculté générale du langage', but the criterial features of both concepts are never expressly set forth. In addition, the rewording (in 1864f) of 'faculty of articulate language' to 'faculty of speech'(71) is indicative either of further dissatisfaction with Broca's ideas or else the result of an incomplete understanding on Jackson's part of what Broca actually implied by his metalinguistic terms. It was only in a case reported a few years later(72) that he showed that he had understood the import of aphemia: he described the patient, who altered words 'but pronounced the real of fictitious syllables pretty well', as having, in great part, lost the 'guiding power in the articulatory apparatus'.

His dissatisfaction with Broca's views may have stemmed from an unfortunate misunderstanding of them. It is more likely, however, that he considered them too restrictive. In 1866, for example, he

commented that in his experience aphemia rarely occurred in isolation: 'generally other troubles besides inability to talk' were found.(73) A short time later, he was pointing out (without, incidentally, providing any argumentation for the opinion) that Broca's 'faculty of language' had 'no existence' and that the terms 'aphemia', 'aphasia' and 'aphrasia' were 'undesirable ones to use in a clinical context'.(74)

What was to be used in place of Broca's concepts? During the years preceding his first major exposition of his own theory of aphasia (at the British Association meeting in Norwich in 1868), Jackson appeared to have no particular theory. Instead, he showed that any theory that was put forward would have to take account of an exceedingly wide range of defects: the inapplicability of Broca's ideas was, then, quite obvious. Any theory would have to be able to handle 'slight defects down to total inability to express anything in any way'.(75) It would also have to provide an explanation for disturbances of writing as well as of speech. This was a topic he had first broached in 1864, but it assumed greater importance in his thinking during 1866. In one paper from that year, considerable space was devoted to verbatim transcriptions of an aphasic's dysgraphic forms as well as to the question of how 'beautiful penmanship' and the ability to copy from books could, in the same person, exist side by side with a total lack of fluency in spontaneous writing.(76)

5.5.2 A physiological interpretation of aphasia

At the same time, he dallied with, rather than constructively investigated a strictly physiological interpretation of aphasia. Thus he described ataxy of articulation and the so-called loss of

memory of words as being 'really defects of the same kind' in that 'the loss of signs ... for a thing' is the same as 'loss of power to reproduce ... the movements [the person] has learned for the signs or at least, the "motor impulse"'. They can be summed up as two types of 'disorders of acquired movements'.(76a) Adding some Spencerian concepts to this explanation, they could be further described as 'a certain series of cultivated anatomical possibilities - of motor and sensory centres ascending in complexity, in inter-relations and in width of associations'.(77)

Although this particular line of argument was never developed further in the remainder of his work, one may perhaps see in his emphasis on the physiological activities that underlie speech the beginnings of his later theory of dissolution and of discharging lesions.

5.5.3 Laterality, hemiplegia and aphasia

An additional question that Jackson recognized as being of significance for any theory of aphasia that he, or anyone else, might propose was that of the relationship between laterality, hemiplegia and aphasia. Was there consistently a right-sided hemiplegia when aphasia was present, or might the same linguistic symptoms be observed with a left-sided one? As we have seen in Chapter 4, this question had been taken up avidly by James Russell in 1864 as a result of a remark by Jackson on the connection between the side of the hemiplegia and the aphasia, but by 1868 the question had become, for Jackson himself, a singularly important one.(78) He, for example, had described a case of aphasia with left hemiplegia (1868a) but he had attributed

the actual symptoms to the fact that the patient had been left-handed. What precisely was the connection between hemiplegia, laterality and aphasia? The question was, in effect, left unanswered.

5.5.4 The 1868 theory

Jackson used the occasion of the annual meeting of the British Association in Norwich in August 1868 to present the first consolidated statement of his views on aphasia.(79) It is obvious from what he said about the subject that he felt he had reached the point where his own observations of cases and his thinking about speech disorders in general during the previous 4½ years had matured sufficiently for him to do more than continue to present descriptions of clinical cases interspersed with some theoretical discussion: the time had arrived to present a 'theory' of aphasia. Doubtless, the presence at the meeting of Broca as well as the degree of interest in aphasia amongst the British medical profession generally by this time may well have compelled him to formulate his ideas in a relatively coherent and systematic manner.

Whereas during the years 1864-1866 his ideas had developed not only as reactions to Broca's views but also with comparatively little reference to his thoughts on the nature of normal communication, one sees in the 1868 theory the influence of ideas which had their origin in this particular topic. Using the distinction between 'intellectual' and 'emotional' language, he points out that in the great majority of cases of aphasia, only 'intellectual language' is disturbed; 'emotional language' remains intact. Secondly, developing a point he had made earlier in the year,(80) (and one that was self-evident in any case to most, if not all, clinicians), he separates off

aphasia (or what he calls 'defects of intellectual expression') from three other conditions: 'defects of voice', 'defects arising from mere paralysis of the tongue and other articulatory muscles' and, thirdly, defects due to a 'fault in the outward organs of reception'. Aphasia is, then, distinguished from (to use the modern terms) aphonia, dysarthria and organically induced hearing loss. These four categories represent the sum total of his classificatory scheme of speech pathologies. Bearing in mind the classification schemes, not only of speech pathology but of aphasia too, that were advanced by some of his contemporaries,(81) Jackson's scheme is remarkably straightforward.

Also, for the first time, he sets up, on linguistic grounds alone, two classes of aphasia. The criterial features of each have been set out in Figure 31. (I have altered the sequence of entries in Jackson's original and added the terminology he employs in the paper itself as sub-headings.) In addition, his exposition of the characteristics of Class I patients from a later paper (1868d), published some three weeks after the Norwich presentation, has been included: it represents certain changes in his views. It will be seen that there are only two semiotic features that unequivocally distinguish the two Classes: a difference in the quantity of speech produced, and a difference in the ability to repeat words. With the other features, there is less of a clear-cut distinction between the two sorts of aphasia.

The paper of 1868d, coming so soon after the Norwich presentation, contains one other important shift in opinion. At Norwich, Jackson had attributed the emotional utterances of otherwise 'speechless'

Figure 31

THE LINGUISTIC CHARACTERISTICS OF CLASS I AND CLASS II APHASICS

(JACKSON, J.H. 1868c, 1868d)

	Class I (1868c)	Class I (1868d)	Class II (1868c)
1. Sensori-motor processes	'more or less destroyed'		'unstable'
2. Speech	'speechless or nearly so; in severe cases some unvarying word or two of jargon'	'when speechless, cannot talk'	'plenty of words, but makes mistakes in words'
3. Word-repetition	'no'		'yes, though sometimes with blunders'
4. Speech-comprehension	'usually can understand; can often understand what is read to him'	'can understand; can follow what is read to him'	'usually can understand'
5. Writing	'suffers more or less in every case; can usually copy writing correctly'	'cannot write himself [i.e. spontaneously] ; cannot copy to dictation; can copy writing correctly'	'suffers more or less in every case; can usually copy writing correctly'
6. Reading	'no'		'no'
7. Sign-making (=gesture)	'least affected'		'least affected'

persons to the fact that the 'sensori-motor processes for words are somewhere, though usually the "will" cannot get at them'.(82) However, this explanation is extended far beyond the domain of expletive utterances to all the utterances of Class I aphasics: 'although the patient is speechless he is not wordless'.(83) This is a major development in his thinking, for whereas previously he had been arguing that the involuntary, expletive type of utterance (which he would in any case locate in the right hemisphere)(84) remains untouched by the brain-damage, now he is putting forward an entirely different opinion: that the actual forms of the language (intellectual as well as emotional) are not destroyed; what is affected is the means of gaining access to them. This classic statement has, some hundred years after its first enunciation by Jackson, become known as the 'performance' view of aphasia.(85)

5.5.5 Interlude

Jackson's next major statement on aphasia was not to be for another ten years. During that time, he continued to describe a number of cases(86) as well as to discuss certain matters which would, in due course, be incorporated into his long paper of 1878-1880. These included the view that the distinction between 'loss of memory for words' and 'loss of movements for words' was by no means as simple or as clear-cut as at first it might appear to be: in fact 'it will not work'.(87) Secondly, in his paper on the nature and duality of the brain (1874a), he discussed whether 'speechless' (i.e. aphasic) patients are able to propositionize internally. He decided they were, on the grounds of their ability to write as well as to understand the speech of other people.

5.5.6 The 1878-1880 theory

5.5.6.1 Introduction

The long and intellectually elaborate work of 1878-1880 is devoted essentially to an exposition and discussion of two themes: the concept of aphasia as a form of 'dissolution' in terms of Spencer's theory of the relationship between normal and pathological forms of neural activity and observable behaviour, and secondly, the actual linguistic characteristics of the forms of speech used by patients who are otherwise deemed to be 'speechless'. Other topics dealt with include the classification of aphasia, the significance of psychological theories in general (not simply Spencer's in particular) for the study of aphasia, and the importance of certain metatheoretical principles in the actual analysis of aphasic data. The paper may be read, on the one hand, as Jackson's personal philosophy of aphasia, and, on the other, as a series of practical instructions and hints to clinicians on the methodology to be employed in analysing aphasic symptoms.(88) In any case, however, it cannot be regarded as a comprehensive statement of Jackson's views on aphasia: rather as a lengthy summary, in certain respects, of views that were still in the process of evolution.

5.5.6.2 What is aphasia?

What is aphasia? Previously, Jackson had defined it as 'defects of intellectual expression'. Now, he says, it must be defined 'on a deeper basis than that of language',(89) as a 'loss or defect in symbolizing relations of things in any way'. This extension in the scope of the concept should, he says, lead to a new term. He suggests 'Affections of speech'. This is a curious choice. In view of his

previously stated view (and one which he repeats in the paper itself, so it cannot represent a change of opinion) that words serve in more contexts than simply that of speech, his term ought, one would suppose, to have been 'Affections of words'. That apart, he half-proposes the term 'asemasia' as a successor to aphasia, but then rejects it on the grounds that the introduction of new terms into the nomenclature of medicine is fraught with problems, not least that of possible misunderstandings - Broca's difficulties over 'aphemia' may well have been uppermost in his mind.(90) Still, his easy acceptance of the word 'aphasia' in the circumstances contrasts strongly with his earlier held view that the word should be avoided.(91)

Rather than continuing, like almost all of his contemporaries, to regard aphasia as a condition in which 'words' are 'lost', or the 'faculty of speech' is 'destroyed', Jackson seeks a wider-based and decidedly more physiological (rather than narrowly anatomical) explanation. He finds it in Spencer's concept of dissolution. In Jackson's words, what happens in aphasia is that there is the 'removal of inhibition over a [physiologically lower, more organic] centre', which, consequently, 'becomes more easily dischargeable' after the 'destruction of function of a higher centre'.(92) In what has become a classic phrase, he summarizes the actual effects by saying that 'positive symptoms arise during activities of lower centres or lower nervous arrangements which have escaped injury'.(93) In a case-report published at about this time, he described aphasia as 'a reduction to a more automatic condition'.(94) (Later I shall indicate that the concept of 'automatic' refers specifically to action of the right hemisphere: it is not to be interpreted, regardless of how it is used nowadays,

as a synonym for involuntary or mechanical behaviour.(95)

5.5.6.3 A multidisciplinary approach to aphasia

Jackson was not alone in believing that the only way forward to an understanding of aphasia lay in using the combined expertise of different disciplines. What he did point out, however, was that in a multidisciplinary investigation, the different disciplines must retain their intellectual autonomies. He specifically mentions the subjects of anatomy, morphology, physiology, pathology and psychology. Thus, 'Morphologically, the substratum of a word or a syllable is made up of nerve-cells and fibres: anatomically speaking, we say it is made up of nerve-cells and fibres representing some particular articulatory movement'.(96) To mix together in a single statement features of the analysis of the same data from different theoretical standpoints is quite unjustified. Nevertheless, this does not mean that all the disciplines have equal status in the investigation. The one he singles out for particular mention is psychology. For example, he points out that the 'perception of images' must be taken into account in the analysis and explanation of aphasia since 'words and images co-operate intimately in most mentation'; in aphasia, the 'image-series' will be found to be undamaged.(97) In a sense he is not saying that the psychological approach to aphasia should take precedence over the others: he emphasizes it to draw it formally to the attention of his medical colleagues who might otherwise have believed that aphasia could be understood solely in terms of certain medical principles. One suspects that Jackson was, in effect, urging not that equal attention should be paid to the various disciplines involved

in the study of aphasia, but that a more open view, less circumscribed by the exigencies of medical training and everyday clinical preoccupations, should be adopted by clinicians. In short, they should recognize the existence of and the potentiality of certain non-medical disciplines in the analysis of aphasia.(98)

5.5.6.4 Aphasia and other organic conditions

A counterpart to the connection of medicine and other disciplines in the study of aphasia is to be found in the wider framework within which aphasia should be examined. It is essential, says Jackson, not to isolate aphasic phenomena from other forms of nervous disease: that is, to recognize that certain characteristics of aphasia have, in a sense, equivalent forms in other types of pathology. Thus, in the same way that an aphasic's arm may be more affected than his leg by an accompanying hemiplegia, so he may be perfectly able to answer 'No' to a question but quite unable to say the word in isolation when requested to do so. (This phenomenon, dubbed the Baillarger-Jackson principle,(99) was first brought to Jackson's attention as early as 1866.) Therefore, it should be borne in mind that there may be milder forms of the linguistic disorder comparable to those within the strictly physical sphere of bodily functions: locomotor ataxy rather than ataxy of articulation, paralleling the condition of hemispasm versus that of hemiplegia.(100)

5.5.6.5 The importance of positive and negative symptoms

At this point in his exposition, Jackson is effectively addressing clinicians on how they should propose setting about the analysis of aphasia. At the same time, however, his remarks may be considered

as indicating a particular set of theoretical principles that he had evolved about the nature of aphasia itself, rather than about the methodology of the analysis. Of these, the most important is undoubtedly his concept of positive and negative symptoms. If, says Jackson, the brain-damage has devastated large areas of the linguistic faculty, yet left other parts of it untouched, then it is essential to consider what the patient can achieve as much as it is to note what he cannot. Thus, an aphasic who says CHAIR instead of TABLE has retained the former word (a positive symptom) whilst losing the latter (a negative symptom).(101) The derivation of this concept from Spencer's theory of dissolution is obvious.

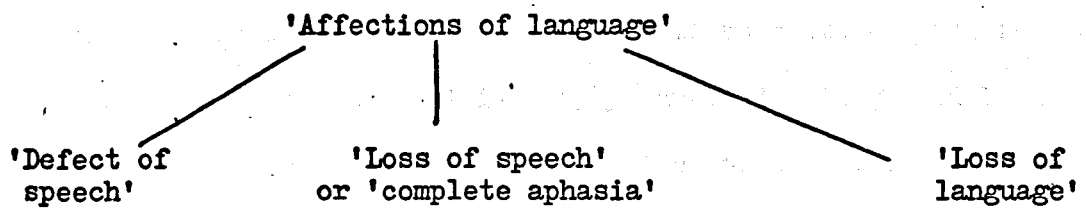
5.5.6.6 'Quantity' and 'rapidity' of lesions

An insight of Jackson's, which appears to have produced no reaction amongst his medical colleagues, concerned the need to take into account the different effects that a particular 'quantity' of lesions might have on the aphasia rather than the 'rapidity' of lesions. What Jackson was saying was that a 'small, sudden haemorrhage' could have 'a greater but more temporary effect' than a 'large, slowly developed softening' which produced a 'more local and more lasting' effect.(102) The importance for clinical analysis and interpretation of the varying effects that different combinations of the parameters of size, speed, and etiology of lesions can have goes beyond what some of his contemporaries had concluded.(103)

5.5.6.7 The classification of aphasic disorders

At the Norwich meeting, in 1868, Jackson had described two forms of 'defects of intellectual expression': Classes I and II. In

the following ten years, his views changed somewhat. The result was that in place of two categories he now set up three. Only one of them was called a 'defect': the other two were severer forms of disorder characterized by a 'loss'. A further change involved the introduction of the term 'language' - something Jackson had earlier avoided.(104) As can be seen from the schema set out below, the previous distinction between a disturbance of 'speech' and a disturbance of 'language' had, by now, been neutralized.(105)



He establishes the differences between these three types on purely "linguistic" grounds; the neurological attributes of the three play no part in setting up the types in the first place. In the category of 'Defect of speech', the patient has a 'full vocabulary', but makes 'mistakes in words': for example, 'orange' for 'onion' and 'chair' for 'table', or uses 'approximative expressions' such as 'light the fire up there' for 'light the gas'. Jackson further notes that these 'mistakes' are not random, but exhibit a recognisable connection with the normal speakers' words. That is, the substitution of, for example, 'worm-powder' for 'cough-medicine' reveals what Jackson calls the 'same class in meaning'; similarly, 'parasol' instead of 'castor-oil' may be explained in terms of certain phonetic similarities between the normal and the pathological forms.

In the second category of 'loss of speech' or 'complete aphasia', the patient is practically speechless, and his ability to gesture is also impaired. Jackson has much to say about the actual linguistic features of this category, and these are discussed below in the next sub-section.

The third category, of 'loss of language' is a severer form of 'loss of speech', not something radically different (as Jackson's use of 'language' rather than 'speech' might suggest). Not only is the patient speechless, but he is also unable to gesture, and, furthermore, his 'emotional language' is deeply involved. It should be noted, however, that Jackson says nothing about the person's level of speech-comprehension or his reading and writing abilities. If these two can be assumed to be involved, then the disturbance is not a purely expressive form of aphasia, but a total or near-total aphasia.

5.5.6.8 The linguistic features of 'loss of speech' ('complete aphasia')

Jackson devotes considerable space to a description and discussion of the positive and negative symptoms of patients in this, his second category. They are summarized in Figure 32,[106] with the sub-headings added. It will be seen that a slight shift had taken place in what he considered to be the defining characteristics of the condition since his exposition of the features of Classes I and II of aphasia in 1868. He now introduces the question of whether the aphasic can sing, drink and swallow. On the other hand, he appears to no longer regard as significant the question of whether the aphasic can repeat words. In general, however, the linguistic abilities that Jackson focuses upon in establishing these cardinal features remain the same as before.

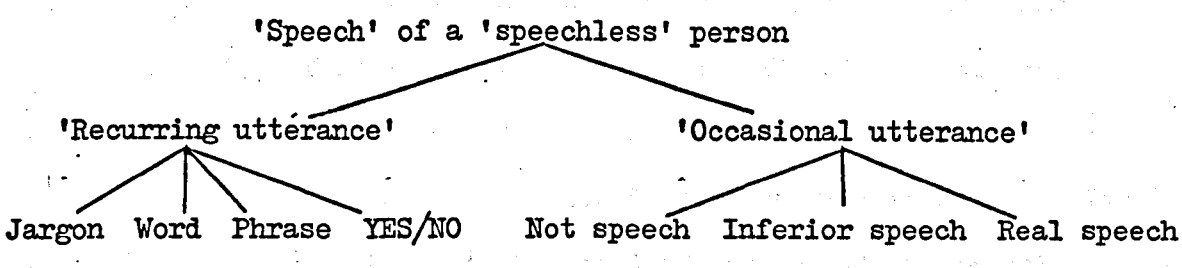
Figure 32

LINGUISTIC CHARACTERISTICS OF LOSS OF SPEECH (COMPLETE APHASIA)

	Positive symptoms	Negative symptoms
Speech	Recurring and occasional utterances unaffected	Unable to speak apart from some jargon, some recurring utterances and some occasional utterances: e.g. swearing and using GOOD-BYE in an appropriate context
Singing	In some cases able to sing	
Emotional Language	Apparently unaffected: he 'varies his voice properly'	
Writing		Unable to write, although penmanship and ability to copy may be unaffected
Gesture		Reduced ability to 'make signs' (including pantomime and gesticulation)
Oral/ Pharyngeal	Able to eat, drink and swallow without difficulty	Unable to protrude the tongue on request (107)
Speech-comprehension	Able to understand what is said or read to him	
Reading		Cannot 'read at all'; not due to 'lack of sight' or 'want of perception'

Despite the implication that in a case of 'loss of speech', the aphasic had lost his speech, that is, was unable to communicate, a good deal of attention is directed to examining the forms of utterance that aphasics in this second category do produce, and, what is more, attempting to find some explanation for them. Unlike all of his contemporaries who simply stated that the 'speechless' patient might be able to say the occasional word such as YES or NO, Jackson looks on the existence of such occasional forms of speech when virtually everything else would appear to have been destroyed - or at least put out of action - as worthy of closer examination. In his paper on the duality of the brain in 1874, he had described the 'speechless' patient as someone who lacked the capacity to 'propositionize internally', the evidence for this being his or her inability to write. Yet, said Jackson, the person retained 'words' as distinct from 'speech'. (He fails, however, to perceive the glaring contradiction between this view of the role of words and propositions in relation to speaking, writing and speech-comprehension, and that expressed earlier, in 1868!)(108) The acid test, however, was the aphasic's ability to understand speech: '... if I say to a man who cannot speak at all, "Gold is yellow," (or anything not difficult or novel to him), he readily understands it. This shows that he still has processes for words in his brain ... The speechless man can receive propositions, but he cannot form them - cannot speak'.(109) This concept of 'speechless' not being equivalent to 'wordless' is retained in the 1878-1880 paper. In the latter,however, he turns his attention away from this highly important philosophical observation to more factual matters, namely the types of utterance that a

'speechless' person could produce. Various types are found, and they are set out below.



5.5.6.8.1 'Recurring utterance'

Three assumptions underlie this aspect of 'loss of speech'. Firstly, in the initial stages of the aphasia, the recurring utterance remains the same, except in a small minority of cases.(110) Secondly, the recurring utterance may serve the function of emotional language and indicate thereby that 'emotional language' itself has not been affected by the aphasia. He qualifies this, however, in an important footnote in which he admits that the 'finest emotional manifestations may be lost'. And thirdly, a patient may use any combination of the four types of recurring utterance with or without one or more types of occasional utterance.

Of the four types of recurring utterance, jargon such as 'Yabby' or 'Watty' has no semiotic value whatever: 'in reality he says nothing with these utterances'.(111) Similarly, a word may be used by the aphasic which to a healthy person would be meaningful (for example, 'men', 'one', 'awful'), but, like jargon, it is not the result of a conscious meaningful proposition.(112) The same assessment would be made of a phrase such as 'Yes, but you know'. It has the semblance of speech, yet despite its propositional structure, it has no propositional function; it is 'intellectually dead'.(113)

The fourth and last type of 'recurring utterance' is the one to which Jackson devotes most critical attention. Very many "aphasiologists" had noted the fact that "aphasics" may produce the words 'Yes' and 'No', but in all cases these apparently simple utterances had not been subjected to any searching analysis, except insofar as comments had been made about "aphasics" sometimes reversing the roles of the two words. Jackson, to his credit, recognized the importance of discovering the reasons why these words are so often retained and why their functions are sometimes reversed - in fact, he considered that they formed 'the most important part of the whole inquiry',(114) that 'the inability to say "no", when told, with ability to utter it in reply and also emotionally, is one of the most important facts in the matter of affections of speech'.(115) Why should he have held this opinion? Why should the matter of YES and NO appear to take precedence over any other issues in aphasiological studies?

Jackson notes that 'yes' and 'no' (or their dialectal variants) may be used by aphasics as interjections, as 'expressions of feeling': in which case, they have no propositional function.(116) A comparable usage in normal, 'healthy language', is the uttering of 'No' in response to a startling piece of news.(117) Secondly, the aphasic may use YES and NO when asked to do so. But can this be construed as speech, he asks, or its simply an 'articulatory gymnastic for the sake of uttering it?'(118) A third usage of 'Yes' and 'No' is as propositions: that is, the aphasic uses the words in exactly the same way as a normal speaker does.(119) There may, nevertheless, be a more subtle form of disturbance here: in certain instances, the aphasic may use 'Yes' propositionally at all times, whereas 'No' is only used

propositionally on certain occasions, for example when a remark requires dissent to be expressed. Yet, the person may be quite unable to use 'No' when asked to repeat it, or when attempting to use it spontaneously of his own volition.(120)

As for the semiotic value of YES and NO, Jackson argues that they 'stand on the border ground [between intellectual and emotional language]',(121) rather than belong exclusively to 'intellectual language'. The evidence is that in 'healthy language' they are used, depending on the actual context, with these two different functions. He quotes the example of 'No, no!', in which the first word is propositional, and the second a reinforcing emotional element.

It is difficult, perhaps impossible, to be certain of the reason why Jackson places such great emphasis on the use of YES and NO by aphasics. In view of the resemblances that he observed between the usage of the two words in both normal and aphasic speech, he may have been hinting at the possibility of aphasic language being in some qualitative sense closer to the forms of normal speech than had previously been contemplated, either by himself or any of his fellow-students of aphasia.

A further issue, in part related to the preservation of certain words in aphasia, is why, compared with the use of YES and NO, a variety of expressions serve as recurring utterances in different aphasics. Jackson's view is that the 'recurring utterances ... were being said, or rather were about to be said, when the patient was taken ill' (where 'taken ill' is interpreted not necessarily as a determinable point in time, but as the 'occurrence of damage ...

sufficiently extensive to cause loss of speech').[122] This is actually a view he had first broached more than ten years earlier, when he had surmised that the 'stock phrases' were 'parts of some sensori-motor processes which were, so to speak, uppermost in the patient's brain when it was suddenly damaged'.[123] He quotes several examples in support of this opinion, including that of a woman who became aphasic whilst riding on a donkey: afterwards, her only phrase was 'Gee gee'.[124] Counter-examples were to be found, however, and Jackson quotes some of these to show that his proposed solution was not necessarily totally correct. One was of a man whose 'last words' before the onset of the aphasia were 'Oh! I feel something extraordinary inside me', but whose recurring utterances were 'No' and 'Mama'.[125]

Jackson believed too that at least some forms of jargon speech used by aphasics could be explained in terms of the theory of 'last words': they are the 'fragments of the words or phrases the patient was about to utter when taken ill'.[126] Such a one was 'Committymy' uttered by an aphasic, which Jackson derived from his last phrase 'Come pity me'.[127] Using a decidedly more neurolinguistic turn of phrase, Jackson explains such jargon as a 'survival of some of the syllables or articulations more or less fused during the sudden termination or arrest of a strong conflict of discharges of numerous nervous arrangements for different words'.[128] But, as cautious as ever, he points out such an explanation cannot be found for a jargon form such as 'yabby'.[129] In effect, then, the question of how the jargon is created by the aphasic is left partially unresolved. It was to remain so for many years.

5.5.6.8.2 'Occasional utterance'

The three characteristic forms of 'occasional utterance' ('Not speech', 'Inferior speech', 'Real speech') have been discussed already.(130) Using this framework within the context of aphasia, 'not speech' will be heard when the person is excited, 'inferior speech' in certain suitable contexts (Jackson only gives the example of talking to horses), and 'real speech' on specific occasions. In the latter, the aphasic will be an otherwise normal speaker. From his description, it is clear that he set great store by the fact that under certain conditions aphasics can achieve 'real speech'. He quotes as an example the ability of one particular aphasic to indicate the position of his bag of tools by saying the solitary word 'Master's'. Possibly such a truncated version of an utterance such as 'They're at my master's house' would never be used in 'healthy language' as a form of 'real speech', and therefore Jackson is wrong to argue that aphasics do achieve 'real speech' on occasions. On the other hand, the thrust of his argument may well be that, as indicated above in the discussion of YES and NO, he may have been trying to reflect his intuitions about aphasia not necessarily being as radically different from normal speech in terms of certain deeper aspects of structural organisation as might be thought.

5.6 The neurology of "language"

Compared with some of the bold assertions by a number of his colleagues on the location of "language" in the brain, Jackson's comments may appear to be somewhat restricted and lacking in confidence. This stemmed as much from the spirit of scientific cautiousness with which he approached the question (cf. also Broca)

as from the range of cases that he had had the opportunity to examine at post-mortem. Unlike certain of his colleagues, Jackson recognized that the entire question of "language" localization was, in its philosophical aspects, hardly a simple one to deal with.

5.6.1 1864: Broca's views

Jackson held Broca in 'great respect and deference',(131) but he was not prepared to follow his views unreservedly. He did, nevertheless, 'tend to support' the view that 'disease of the left side of the brain only' produces loss of language, and, secondly, to agree with, but 'in a general way' only, Broca's claim that the faculty of articulate language was located in a 'very limited' part of the brain.(132) His grounds for not committing himself further were, firstly, that he felt that insufficient observations had been made with which to justify Broca's point of view; secondly, that more precise autopsy data was required. In these respects, he had the support of a number of fellow-workers in aphasiology. Where he revealed a more searching caste of mind was when he surmised that language may be located in a smaller area than that of the left inferior frontal gyrus. He says there may be a 'slighter physiological difference' at work: that is, the area responsible for language may be of a smaller order than a gyrus. Perhaps more important still was his view that the two hemispheres may not be 'accurately symmetrical' and, in this connection, that there would seem to be no a priori reason why 'convolutions for language on each side' should occupy corresponding positions in the two hemispheres.(133) At the time, he never elaborated on these important views, and it was only in a later paper (1872b) that he suggested that 'the "important" part of the right hemisphere

is the posterior lobe' whereas in the left hemisphere it is the anterior lobe.(134) The role of the right hemisphere in "language" processing became a major topic in his 1878-1880 paper.(135)

5.6.2 1864: The importance of the left middle cerebral artery

Throughout the 1864 series of papers, the role of both middle cerebral arteries assumes a degree of importance in Jackson's thinking: 'the faculty of speech [may be] in the same part of the brain supplied by the left middle cerebral artery';(136) 'an embolism [in] some branches of one or both middle cerebral arteries' may have been the cause of the aphasia.(137) Notwithstanding the latter quotation, there was a clear tendency for Jackson to conclude that it was the left rather than the right or both arteries that was implicated in the causation of aphasia.(138) Occasionally, however, he confessed that it had to be admitted that the damage was too extensive 'to help us to determine anything precisely as to the seat of speech'.(139)

5.6.3 1866: The left middle cerebral artery; the corpus striatum; the right hemisphere

In the course of the 1866 papers, the theme of localization is developed in three different directions. Firstly, a subtlety is introduced into his earlier view that the left middle cerebral artery is involved in "language". He now concluded that an embolism in one of its branches may lead to a 'difficulty in "finding" the right word (i.e. in making the right signs) rather than in the process of manufacturing the signs'.(140) On the other hand, it is to disease in the medulla that difficulties in articulation arising from a paralysis of the tongue, palate or vocal folds should be attributed.(141)

This latter remark about the role of the medulla was not an original observation: as was pointed out in Chapter 2, a number of clinicians had remarked on it. But it is the former remark that contains an important insight, one that none of his colleagues had stumbled upon. Unfortunately, he never developed it further.

The second development in his thinking about localization concerned the corpus striatum. From the clinical evidence that he had assembled, Jackson believed that damage near the corpus striatum affected 'language and thought' inasmuch as 'more or less parts which help in making symbols are broken up'.(142) In more precise terms, the nearer to the corpus striatum the actual damage lies, 'the more likely is the defect of articulation to be the striking thing', whereas at a greater distance from it 'the more likely is it to be one of mistakes of words'.(143) In a phrase which perhaps reflected a semi-conscious opposition to Broca's views on aphemia, Jackson states that the 'convolutions near the corpus striatum have to do with guiding muscles'.(144) Again, such an opinion was very much in line with what some of his colleagues had been saying.(145)

Thirdly, as distinct from Moxon's theory that an 'organ of language' is located in both hemispheres and that both play an equal part in speech production,(146) Jackson maintains that the right hemisphere does have a role in speech production, but it is subsidiary to the left. It is used, he says, for 'educated utterances, which are in a sense involuntary' as a result of the process of 'habit' and 'frequent education'.(147) This view, expressed in language which is far from unequivocal, was to become in later years a major topic of interest for Jackson.(148)

5.6.4 1867-1868: Other areas involved in speech production

A consideration of his case-reports for 1867-1868 indicates the type of evidence he was beginning to gradually build up about the localization of speech. In all the cases reported, the area(s) of damage could be found without any difficulty - indeed, in certain instances the damage was so considerable and spread over such a large area that it could hardly be missed: for example, that of a man who had been speechless for 8 years and whose brain, at autopsy, revealed 'a great chasm betwixt the anterior and middle cerebral lobes ... the corpus striatum [being] shrivelled and flat ... the convolutions ... practically wanting, from the ascending parietal, inclusive, to the posterior thirds, inclusive, of the first, second and third frontal'.(149) In another case, there was in the left hemisphere a 'large cyst involving the entire length of the corpus striatum', and in the right hemisphere an 'enormous clot'; in addition, a 'little effusion of blood' in the lower part of the pons.(150)

The following summary of the anatomical findings in the numerous cases described in the 1867-1868 paper indicates how, for Jackson, the question of correlating brain and language functions was an exceedingly complex one. In many of his cases, the results were at variance with those that some of his British and French colleagues had described. (Roman numerals refer to the number of the case.)

1. Damage in one or both hemispheres (no precise information given)

   I, II, XI, XVI, XXIII

2. Damage in both hemispheres

   XX, XXI, XXII, XXX

3. Damage in left hemisphere only

XII, XIII, XV, XVII, XVIII, XIX, XXIV

4. Damage in specific areas

(a) Pons: XXII

(b) Thalamus: XIX, XXX

(c) Corpus Striatum: XV, XVII, XVIII, XIX, XX, XXI, XXII, XXIV, XXX

(d) Inferior horn of lateral ventricle: XIII

(e) Insula: XIX, XXX

(f) Pre-Sylvian area: XVIII

(g) Lateral sulcus: XIII, XV, XXX

(h) Inferior frontal gyrus: XIII, XV, XVIII, XXIV[151]

(i) Middle frontal gyrus: XIII, XV, XXIV

(j) Superior frontal gyrus: XXIV

(k) Anterior lobe: XXI

(l) Parietal lobe: XIII, XV, XXIV

(m) Middle Cerebral Artery: XVI, XVIII

(n) Branch of anterior cerebral artery: XVII

(o) Left common iliac artery: XVI

A striking feature of Jackson's views at this point is his open-mindedness about the precise seat of "language". Although he tended to favour certain areas, he felt obliged to describe the evidence that ran counter to his views. Indeed, this unwillingness to commit himself to one particular area and to have to find a reasonably convincing explanation of the discrepancies typified much of this thinking about "language" localization. What appeared to matter above anything else was to work in terms of broad and justifiable generalizations: in effect,

to see the wood rather than the trees. In this respect, he was hardly in line with the thinking of many of his contemporaries, who seemed to want to find a single 'area' that was responsible for 'language'. For Jackson, more basic questions about language and about the structure and functioning of the brain had first to be answered before any such investigation could genuinely begin.

5.6.5 Further views on the role of the right hemisphere

A development of his previous view that the right hemisphere is involved in the processing of 'educated utterances which are in a sense voluntary', is to be found in a single, almost chance, remark that the function of the right hemisphere in speech is to handle (all) 'involuntary' and 'automatic' responses.(152) Regrettably, he does not produce any formal evidence for this statement, couching it instead in terms of 'I believe' and 'I think'. Nevertheless, this was the seed from which a fuller hypothesis on the right hemisphere was to grow.(153)

He does, however, discuss one particular aspect of right hemisphere function, namely its role in speech-comprehension. He says that when we hear speech, we 'apprehend' not only the actual words but also the order of the words; it is this second level of apprehension - the grammatical, in fact - that permits us to work out the meaning of a word-sequence. Thus, on hearing the word 'horse', for example, the 'motor sign [for it] is, or may be, developed automatically on the right side of the brain, for it is ... possible to rouse it in a man who has lost the side of voluntary revival of words by disease'. Then, 'the automatic motor sign "horse" acts on the left side of my brain ... and developes that perception with which it is arbitrarily associated'.(154)

The right hemisphere is mentioned again a few years later, but a new factor enters the discussion. In a case of aphasia with left hemiplegia (Jackson 1872b), Jackson states as a fact (but again adduces no evidence) that 'the "important" part of the right hemisphere is the posterior lobe', whereas in the left hemisphere it is the anterior lobe. (He does not mention the handedness of the patient; otherwise, it would be possible to hypothesize as to whether he believed that in a left-handed person with a left hemiplegia the posterior lobe was, in a sense, the crucial area for speech production.) The idea of a lack of congruity between the two hemispheres is developed further in his 1874 paper on the duality of the brain, in which he states that damage in the left hemisphere 'will destroy speech altogether', but damage in the right will still allow the person to 'speak perfectly well', regardless of the extent of the damage.(155) This latter statement is clearly an extension of the view, expressed in his 1866c and 1866d papers, that the role of the right hemisphere in speech production is restricted to so-called 'automatic' utterances. Whereas extensive damage near the left corpus striatum will destroy speech, he says, an equivalent condition in the right hemisphere 'does not affect speech at all'. He further makes the point, since regarded by himself and others but not by all aphasiologists, as crucial, that 'to locate the damage which destroys speech and to locate speech are two different things'.(156)

In the same paper (1874a), more precise functions are attributed to the right hemisphere: like the left, it 'contains processes for words' but unlike the left, which is 'that by which we speak', the role of the right is for 'other processes in which words serve'.(157)

This slightly obscurely worded but nevertheless important comment he subsequently clarifies by saying that in the right hemisphere one finds the 'most automatic use of words'. Put another way, the right hemisphere is the means 'by which we receive propositions'. In other words, the role of the right hemisphere is for purposes of speech-comprehension. He does, however, acknowledge that a clear line of demarcation cannot be drawn between 'automatic' and nonautomatic or 'voluntary' uses of words (in the left hemisphere 'automatic merges into voluntary use'). His metalinguistic use of the two terms 'voluntary' and 'automatic' is important: by the first he implies the conscious decision to speak; by the latter the involuntary manner in which speech is heard and understood. Only in one particular context does the term 'automatic' refer to the expressive, not the receptive, aspect of communication: when he uses it to refer to the spontaneous and uncontrolled outburst of emotional language.(158)

Within two years, however, there was an important development in his thinking. Whereas he had earlier stated, in deliberately cautious terms, that he supposed there was 'automatic' revival of words prior to their 'voluntary' revival (that is, in speech), now he is more affirmative of a significant role for the right hemisphere in speech production, not just comprehension: 'Before a proposition is uttered, before voluntary use of words, words must have been automatically revived'; 'On the right half there is faint automatic reproduction of words before the stronger voluntary reproduction on the left'.(159) The evidence is strictly analogical in character: in 'gross physical operations', for example moving of the hand, certain prior activities are essential, namely the fixing of the shoulder, the arm and the wrist.

Jackson recruits Spencer's opinion, quoting his comment that 'we desire before we will'. At no point, however, does he notice the discrepancy between his new view and the one he had admitted earlier, that extensive damage in the right hemisphere will not affect speech.

In his long 1878-80 paper, the theme of the dual representation of language, with words in both hemispheres, is continued but not developed. He does, however, offer a small note of caution when he says that on the basis of autopsy data there are exceptions to his view. Nevertheless, he continues at the same time, in a sense side-stepping the central issue, by saying that 'the thing of infinitely greater significance is that damage in but one half can produce speechlessness; it is equally significant that damage in neither half produces wordlessness'.(160)

His final - and possibly most tantalizing - comment on the role of the two hemispheres in speech-comprehension is found in an almost casually worded footnote to his paper of 1880. He raises, for the first and, unfortunately, the last time, the question of whether the processes involved in understanding speech could involve both hemispheres: 'It has recently occurred to me to inquire whether the process of receiving speech of others may not also require a double service of words ... there may ... be a double process, starting in the right cerebral hemisphere and ending in the higher centres of the left - centres higher than those commonly believed to be the sole speech-centres'.(161) He never attempted to develop or, as far as we know, investigate clinically these two issues of the 'duality' of the brain in speech-comprehension and the existence of centres 'higher' than those he had previously taken note of.

5.6.6 Type versus location of damage

Another development in his thinking about the actual neural bases of speech concerns not the location of the damage but the type of damage. (Earlier he had commented briefly on the difference between 'quantity' and 'rapidity' of lesions.)[162] In his words, 'morbid processes have ... different seats of election'. He notes that in most, but not all, cases involving 'frequent errors in words'[163] the damage is caused by local cerebral softening; in cases of ataxy of articulation, the damage is, in most cases, due to haemorrhage.[164]

5.7 The influence of Jackson in aphasiology

Head relates how, from talking to Jackson in the last few years of the latter's life, he gained the impression that 'he seemed to have lost heart with regard to his papers on aphasia, in consequence of the complete neglect into which they had fallen'.[165] How did Jackson's contemporaries view his work on aphasia, and what reason or reasons can be found for the lack of any proper estimation of their worth?

There is little doubt that he was regarded as an important figure in the field of aphasia studies (as well as in clinical neurology generally). He was set alongside such other researchers as Gall, Broca and Wernicke.[166] He was also credited with being the person who brought the subject of speech disorders to the attention of the general medical public.[167] And he was even considered to be the person who had done more than any other clinician - at least in the 1860s - to 'elucidate the subject of cerebral loss of speech'.[168] His contributions were considered to be 'thoughtful and philosophical'.[169] But all of these statements are couched in the form of general remarks;

nothing is said about why precisely Jackson's work was considered to be of significance.

If we look at the evidence of his influence on the thinking and practice of his contemporaries, then we find that not a single clinician was inclined to follow wholeheartedly his points of view. There was considerable repetition of some of the key-terms in his work such as 'propositions', 'intellectual language and emotional language' (see below for further discussion), but the one that provided the key to his whole philosophy of language disturbances, namely dissolution, failed to attract the attention of his colleagues. No clinician took up the concept and attempted to show its validity (or otherwise) for the analysis of other aphasic patients. Instead, where a theoretical preference could be noticed, it was for Broca's ideas not Jackson's.

The influence of his ideas (or merely terminology) can be seen in three areas: the nature of language, the linguistic features of aphasia, and the localization of language in the brain.

His distinction between intellectual and emotional language is quoted sporadically, but only in explanation of the aphasic's ability to achieve some form of communication.(170) Similarly, the terms 'proposition' and 'propositionize' appear occasionally in some case-reports.(171) Only once is there any reference to Jackson's views on the nature of 'talking', and even this is only a direct quotation from one of Jackson's papers,(172) not a development of his concept.

As for the linguistic features of aphasia, the influence of Jackson is seen mainly in the terminology and in the features of the aphasia that are chosen for mention. A number of authors refer to the ability

of some aphasics to swear, when other speaking functions are absent.(173) Jackson's concepts of 'automatic utterance' and 'recurring utterance' are also used, but in only two case-reports/discussions.(174) However, his example of the word YES and NO being retained and used (with varying degrees of accuracy) by aphasics finds numerous counterparts,(175) but no clinician attempted to discuss the phenomenon in terms of Jackson's views.

There are even fewer direct references to Jackson's views on the localization of "language". Two authors refer to his views on the significance of the left middle cerebral artery and the cortical territory it serves for an understanding of the differing results obtained at post-mortems on aphasics' brains.(176) But there is only one direct reference to his contention that the right corpus striatum may act as the seat of 'word-groups'.(177)

What explanation can be found for the relatively limited attention that his contemporaries paid to his ideas on aphasia? In the case-reports and discussions themselves there are no direct criticisms of Jackson's points of view, which might have thrown some light on this question; one must therefore suggest some. Since Jackson placed particular emphasis on the need to establish a coherent philosophy of language before any analysis or overall understanding of the various aphasic conditions could be achieved, it may well be that his contemporaries, most of whom would have considered themselves to be only medical clinicians not medical philosophers in addition, regarded his suggestions as somewhat tangential to the main problems they faced. A considerably simpler hypothesis (or so it seemed) which stated that the 'faculty of articulate language' was in the 'third left frontal

convolution' would have been far easier to test - and might equally well have appeared to be more relevant in the general climate of opinion of the day about the correlation of neural and mental phenomena. Indeed, the feature of correlation may hold the key to this puzzle: Jackson's thinking was directed to the question of setting up the right theoretical framework for an understanding of aphasia; the thrust of much of the work in clinical neurology since the early 1860s in the British Isles (as elsewhere) was in the field of localization theory. For Jackson, the question of localizing particular functions was not to be neglected, but for the study of aphasia in general it was not considered to be of overriding importance. In the eyes of his contemporaries, a lengthy disquisition on the nature of 'words' might have seemed somewhat obtuse, when the major issue confronting neurologists, especially in the 1870s, was that of correlating data on brain function and observable behaviour. Jackson could then have been described as being, simply, out of step with the type of approach his contemporaries in aphasiology might have wished to see him developing during these years.

A further reason for the comparative neglect of his ideas may have been to do with the fact that he never produced a single composite work setting out his views on aphasia. Unlike, for example, Bateman, Ross and (in 1898) Bastian, he never published a book on the subject. The nearest work to a summary of his views in his long paper in Brain between 1878 and 1880, but even this is more in the nature of an advanced treatise, picking up earlier ideas and developing them further, rather than a relatively full statement ab initio of the nature of aphasia.

Compared with the 20th century's view (or rather views) of language and of the nature of aphasia, Jackson's ideas may seem peculiarly limited. After all, his concept of linguistics went no further than some suggestions on different aspects of the process of talking; and his only two units of linguistic structure were the word and the proposition. He had nothing to say about grammatical processes,(178) about the organization of the sound material of language, and about the structuring of meaning. Nevertheless, he felt convinced that his approach was the only one that could provide the clinician with the requisite intellectual apparatus with which to understand aphasia. Ironically, his contemporaries were not convinced: today his important observations have come to be regarded in some quarters as providing a firm foundation not only for the study of aphasia but of language in general, or at least parts thereof.(179)

5.8 Summary and conclusions

Jackson's studies of aphasia were spread over 30 years of his life, and resulted in the publication of over forty papers on the subject. No other clinician contributed as much to the literature on aphasia as he did. From the very beginnings of his interest, which derived from his studies of hemiplegia, it was clear that his attention was directed, not towards, for example, analysing aphasia in linguistic and phonetic terms - although he later rightly emphasized the need to preface any generalization about an aphasic's condition with a statement of his retained as well as his damaged capacities - but, instead, towards developing a philosophical point of view that would account for aphasic behaviour and any post-mortem evidence

directly referrable to it. In this respect, he may be contrasted with, on the one hand, Bristowe, and, on the other, Broadbent. Bristowe's innovation in aphasia studies was to point out the value of making a detailed analysis of aphasic speech, using phonetic principles. Broadbent's was to develop a psychological interpretation of the role of certain linguistic categories. Jackson's approach was more abstract still: to try, as Broadbent himself later described it, to 'comprehend the underlying significance of phenomena'.

Initially, Jackson's views on the nature of language were of his own devising; then, gradually, a limited influence was exerted on them by the works of Max Müller, Tylor and Latham, and, more generally, by ideas that were current in philosophy and psychology. Ultimately, however, the theory of language that Jackson developed owed little to anyone or anything else.

His views on aphasia were originally coloured by Broca's, but he soon recognized their strictly limited scope in the context of the wider neurolinguistic goal he had semi-consciously set himself: to explain all aphasic phenomena, not just aphemia in particular.

He fully realized that a totally physiological approach to aphasia would not necessarily provide him with the answers to the problems: psychological principles (or at least some of them) had an important role to play in the development of his ideas. Nevertheless, he had the insight to perceive that all aphasic data was finally physiological in character, and that attempts to explain some

of it in physiological, others in psychological terms, would eventually still leave certain aspects unexplained. The key to it all lay, he believed, in Spencer's theory of dissolution - ironically, a physiological explanation put forward by a psychologist!

On the question of aphasia classifications, his views were deliberately unpretentious, and compared starkly with some that a number of his contemporaries proposed. In 1868, he distinguished between two forms of aphasia, using as criteria different features of the expressive linguistic capacity; he did not base the distinction on the expressive/receptive dichotomy. Ten and more years later, a three-fold distinction was suggested, and again it was based on varieties of expressive aphasia.

He had much to say about 'speechlessness', and showed that those few linguistic forms that were retained, as it were, by aphasics, appeared to contain an inner logic of their own, related, in part, to their role in what he called 'healthy language'.

His views on language localization originally followed those of Broca, but he soon recognized their limited usefulness. He adopted a larger, wider view, which involved, in any case, accounting for counter-examples to his own thesis. He raised questions concerning not only the role of other areas in the left hemisphere besides the inferior frontal gyrus, but also the role of both hemispheres together or the right hemisphere in isolation during the processes of speech production and speech comprehension. Cautiously, he concluded that the right may well be used in certain aspects of speech production, and that it is so used in

speech-comprehension; although the left may also have a part to play in the latter.

The effect of his views on his contemporaries was relatively slight, at least judging by the references to them in the medical literature.

What Jackson achieved was a particular type of neurolinguistic theory. It differed in many respects from the sort of approaches to one that were being developed by some of his contemporaries; it also differs greatly from the sort of theory being devised today. Nevertheless, despite the relative absence of obvious 'linguistic' concepts in it, it does still deserve the description: what Jackson elaborated were the fundamental issues that any neurolinguistic theory must ultimately confront.

NOTES TO CHAPTER 5

(1) Broadbent, W.H. 1903:323.

(2) Aigré 1879.

(3) Sully 1880.

(4) Head 1915.

(5) Cf. also more recently, in similar vein, Lassek 1970:5.

(6) Cf. Riese 1956, 1961, 1965. It seems to me that a certain naivety surrounds some of the latter's comments. Implicit in what he says is the assumption that Jackson must have been familiar at first hand with certain passages in the work of philosophers such as Aristotle, Locke, Hume and Kant. He makes no allowance for the possibility of Jackson's having met with the various concepts either from a chance mention of them in other works or from conversations with colleagues in medicine or in other disciplines. To give but one example: Riese suggests that the source of Jackson's definition of the 'proposition' was Aristotle. This may indeed be the ultimate origin of the concept, but Jackson could have found it in virtually any 18th or 19th century work on logic.

Greenblatt (1965) has listed and discussed other influences on Jackson, namely Laycock, Paget, Tuke, Hutchinson, Brown-Séquard and Lewes. He fails to mention, however, one other important person, namely Broadbent: 'I, as one of [Broadbent's] disciples, heartily acknowledge great indebtedness to this distinguished physician for the help his writings have for very many years given me in my medico-neurological studies' (Jackson, J.H. 1907:180).

(7) Greenblatt 1964, 1965, 1970, 1977.

(8) Engelhardt 1972, 1975. Even so, it is surprising that he makes no mention of Jackson's main work on this topic, his lengthy paper of 1879 entitled 'Psychology and the nervous system'.

(9) Head 1915; Riese 1965.

(10) Head (1915:187-190) purports to list, in chronological order, all of Jackson's papers on 'affections of speech'. The list is not always chronological, nor is it comprehensive. Thus Head's first entry (my 1864g), published in November 1864, precedes my 1864a, published in January 1864! To his list should be added: 1864f, 1865, 1867-68, 1868b,d, 1871a, 1872b,c, 1886, Page & Jackson 1869.

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In certain of Jackson's papers, especially those published in 1864, there appear to be a number of contradictions, occasional obscurities and the omission of certain logical connectives in the argumentation. These may not be attributable directly to Jackson himself, since they are written in the third person, in the form of medical reporters' accounts. The possibility cannot be discounted, therefore, that Jackson may not have penned all of them himself.

(11) Jackson, J.H. 1878-1880.

(12) Jackson, J.H. 1867-1868.

(13) Op.cit.:Case I; see also Case II.

(14) Op.cit.:Cases XX, XXI, XI, XVI, XIII, XV, XIX, XXIV, XXX, XVII, XVIII.

(15) 1871a,b.

(16) 1874b.

(17) Jackson, J.H. 1864h:422-23, 440, 457-458. Cf. Critchley 1960a:614; Greenblatt 1965:370.

(18) Jackson, J.H. 1864f:604.

(19) Jackson, J.H. 1864h:402.

(20) Op.cit.:404.

(21) In his Will, dated 24 February 1911, some 7½ months before his death, Jackson bequeathed, amongst other things, all his MSS to one of his cousins, Charles Samuel Jackson, a London barrister, adding that 'it is my wish that ... Charles Samuel Jackson shall destroy with his own hands all my letters and diaries and all my case books and all correspondence relating thereto'. As far as is known, this wish was acceded to. Nevertheless, some fragments of material which he had intended to leave unpublished were in fact published in his lifetime. A short extract from an otherwise unpublished paper of 1868 appeared in 1878:716. An extract from a longer, hitherto unpublished work, dating back 'some years' was included in 1880:637-638. It must have been written some time before November 1879, because the patient was described as having been seen in the company of a colleague, Dr. Harry Leach; Leach died in November 1879 (Lancet ii, 1879, 812, 855-856).

(22) Jackson, J.H. 1864a:123.

(23) 1864f:604.

(24) 1864h:389.

(25) 1864a: 123.

(26) 1864h: 364.

(27) 1865:283.

(28) See below, sub-section 5.6.1.

(29) 1864f:604.

(30) See sub-section 2.5.2 and note (135) to Chapter 2.

(31) 1866a: 175. He had first raised this question in 1864h:452-455 [Case XXXII], although he had not put forward any explanation for it at the time.

(32) Jackson, J.H. 1866a:175. He had quoted this same remark earlier, in 1864 (1864h:440), but at that time its relevance for aphasia had apparently not struck him.

(33) 1866a:175. The same distinction appears in Bailey 1863:86-87. Jackson may well have taken it from him.

(34) 1864h:453.

(35) 1866a:175.

(36) 1868c:275.

(37) 1874a:21.

(38) 1878-1879:311.

(39) 1878-1879:312.

(40) Cf. Riese 1961, 1965. See also note (6) to this Chapter.

(41) 1878-1879:312.

(42) 1879-1880:221. Cf. also 1878-1879:312.

(43) 1878-1879:312.

(44) See, for example, Spencer 1870:162.

(45) Jackson, J.H. 1879-1880:329.

(46) 1878-1879:321.

(47) In the 1878-1880 paper he had already contrasted 'pantomime' (for example, throwing the arms upwards to indicate upwards) and 'gesticulation' (throwing the arms upwards to express surprise) (1878-1879:319), and had introduced, in connection

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with the latter (i.e.'gesticulation'), the term 'pantomimic proposition'. An example is nodding or shaking the head to indicate assent or dissent (1879-1880:209).

(48) 1893:205.

(49) 1879-1880:215.

(50) Op.cit.:217.

(51) Op.cit.:342-343.

(52) Op.cit.:218.

(53) See sub-section 4.9.6.

(54) Jackson, J.H. 1879-1880:220.

(55) 1879-1880:209.

(56) 1879-1880:211.

(57) 1864h:413, 418, 424, 448, 457, 458.

(58) Op.cit.:412.

(59) Op.cit.:412, 418, 448, 458, 437.

(60) I am grateful to Professor David Abercrombie for this information.

(61) See, for example, Jakobson 1966:251 and 1971:passim.

(62) Jackson, J.H. 1864a:123.

(63) Jackson, J.H. 1878-1879:304. Cf. also 1864h:464.

(64) He may well have come across it in the Medical Times & Gazette, the periodical in which he had published his 1864a and 1864b papers. In the issue of 14 May 1864 there was a short extract from the New York Times explaining Trousseau's term (Med.Times & Gaz. i, 1864:534).

(65) Jackson, J.H. 1864c:573.

(66) Loc.cit.

(67) Jackson, J.H. 1864f:604.

(68) Jackson, J.H. 1864h:471.

(69) Jackson, J.H. 1864d:167.

(70) Jackson, J.H. 1864e:167.

(71) Jackson, J.H. 1864f:604.

(72) Jackson, J.H. 1867-1868:458 [Case XXV].

(73) Jackson, J.H. 1866b:442.

(74) Jackson, J.H. 1866c:660.

(75) Jackson, J.H. 1866c:659-660.

(76) Jackson, J.H. 1866c:660.
(76a) Jackson, J.H. 1866d:328.
(77) 1866f:605.

(78) 1868b:457.

(79) Jackson, J.H. 1868c. Nowhere is there a full verbatim account of what he actually said. Only a single paragraph is quoted in 1868d:358, f.n. (d). The longest and most detailed summary (prepared by a medical reporter), which I have used here, is in the Medical Times & Gazette. Other, briefer, accounts are in the British Medical Journal and the Medical Press & Circular (see Bibliography for full details). There is not even an abstract of the paper in the 'Notices and Abstracts of Miscellaneous Communications' of the Report of the 38th Meeting of the British Association for the Advancement of Science ... August 1868 (London: John Murray, 1869, p.120).

(80) Jackson, J.H. 1868a, b.

(81) See Chapter 4, sub-section 4.13.

(82) Jackson, J.H. 1868c:276.

(83) Jackson, J.H. 1868d:359.

(84) See below pp. 468 & 471-474 for a full discussion.

(85) Cf. Weigl & Bierwisch 1970.

(86) Jackson, J.H. 1871b, 1871c, d, 1872a, b, c, 1874b, c, 1876, 1877, Page & Jackson 1869.

(87) Jackson, J.H. 1873b:187. Cf. also Chapter 4, sub-section 4.10.2.

(88) A résumé is given by Sully (1880). Although Jackson published his paper in three parts over the space of a year, it will be treated here as if it were a single work, as an intellectually consistent account of his ideas. Perhaps the single text was split into three sections because of the exigencies of editorial policy; it is more likely, however, that Jackson wrote it as three separate items, and the occasional shifts in his opinion on certain matters can be accounted for on this basis.

(89) Jackson, J.H. 1879-1880:348.

(90) Jackson, J.H. 1878-1879:311.

(91) Cf. p. 446.

(92) Jackson, J.H. 1879-1880:336.

(93) Op.cit.:333.

(94) Jackson, J.H. 1878:717.

(95) See below, sub-section 5.6.5.

(96) Jackson, J.H. 1878-1879:306.

(97) Op.cit.:334.

(98) This interpretation finds some support in the views of an American clinician (Irish by birth), Samuel O.L. Potter. See Potter 1882:1.

(99) See Alajouanine 1962.

(100) Jackson, J.H. 1878-1879:307-308.

(101) Op.cit.:316.

(102) Jackson, J.H. 1879-1880:343-344.

(103) Cf. Chapter 4, sub-section 4.8.10.1.1.

(104) Cf. p. 433 and note (22).

(105) Cf. with 1864a:123 in Figure 30.

(106) Jackson, J.H. 1878-1879:317-319.

(107) Jackson had first realized the importance of this negative symptom in his case-report of 1878 (Jackson, J.H. 1878:716).

(108) Jackson, J.H. 1868c:275.

(109) Jackson, J.H. 1874a:21.

(110) Jackson, J.H. 1879-1880:205.

(111) Loc.cit.

(112) Op.cit.:205-206.

(113) Op.cit.:209-210.

(114) Op.cit.:209.

(115) Op.cit.:214.

(116) Op.cit.:210-211. At this point in his exposition, he mentions that the aphasic uses 'different tones', and refers the reader to Tylor's description of (to use modern terminology) lexical tonal contrasts in certain South-East Asian languages. He clearly misunderstands the role played by pitch fluctuation in these languages.

(117) Op.cit.:214-215.

(118) Op.cit.:213-214.

(119) Op.cit.:211.

(120) Op.cit.:212.

(121) Op.cit.:214.

(122) Jackson, J.H. 1879-1880:326.

(123) Jackson, J.H. 1867:71.

(124) Jackson, J.H. 1879-1880:229-230.

(125) Op.cit.:337.

(126) Jackson, J.H. 1879-1880:338.

(127) Op.cit.:341.

(128) Op.cit.:342.

(129) Op.cit.:339.

(130) See sub-section 5.4.5.

(131) Jackson, J.H. 1864h:464.

(132) Op.cit.:388.

(133) Op.cit.:463.

(134) Jackson, J.H. 1872b:514.

(135) See below, sub-section 5.6.5.

(136) Jackson, J.H. 1864c:572.

(137) Jackson, J.H. 1864g:606.

(138) See 1864b:482, 1864c:572, 1864f:604.

(139) Jackson, J.H. 1865:283.

(140) Jackson, J.H. 1866c:662.

(141) Jackson, J.H. 1866a:175-176.

(142) Jackson, J.H. 1866c:661. Cf. also 1871b:703.

(143) Jackson, J.H. 1866c:662.

(144) Op.cit.:661.

(145) Cf. Chapter 4, sub-sections 4.8.10.1 and 4.8.10.2.

(146) Cf. Jackson, J.H. 1866c:661 and Moxon 1866.

(147) Loc.cit.

(148) See below, sub-section 5.6.5.

(149) Jackson, J.H. 1867-68:380 [Case XXIV].

(150) Op.cit.:375 [Case XXII].

(151) In one case, XII, described for Jackson by a provincial colleague, 'Broca's spot is implicated', yet there was no speech problem (p. 351). See also Chapter 4, note (284).

(152) Jackson, J.H. 1866d:359.

(153) See below, pp. 472 - 474.

(154) 1868e:527-528.

(155) 1874a:19.

(156) Op.cit.:19.

(157) Op.cit.:20.

(158) Op.cit.:21.

(159) 1874a:43.

(160) 1879-80:329.

(161) Jackson, J.H. 1880:637.

(162) See sub-section 5.5.6.6.

(163) He does not state exactly what he means by this: presumably cases of word-finding difficulty.

(164) Jackson, J.H. 1878-79:308.

(165) Head 1926: I, viii-ix.

(166) Cf. Bastian 1869b:474; Anon. 1873:759; Gowers 1888:101, 1893:109; Shaw, E.A. 1893:493.

(167) Wilks 1868:57.

(168) Bateman 1868b:69 (repeated in Bateman 1890:65).

(169) Watson, T. 1871:491.

(170) See Robertson, A. 1867a:508; Ross 1881b:612; Ross 1886a:265; Review of Ross 1887 in B.M.J. ii, 1887: 1389; Shaw, E.A. 1893: 493. Broadbent also uses Jackson's phrase 'intellectual expression'(Broadbent, W.H. 1879:489).

(171) Broadbent, W.H. 1872:148, 158; Johnstone 1879:986; Ross 1881b:614-615; Ross 1886a:266.

(172) Tanner (rev. Broadbent) 1875:398. The author was Broadbent himself; Tanner had died in 1871 (see DNBc:2046).

(173) For example, Robertson, A. 1867a:508; Tanner (rev. Broadbent) 1875:402; Aitken 1880:485; Ross 1886a:270.

(174) Gairdner 1883:310; Johnstone 1879:986. See also the comments by Wilks in Wilks & Moxon 1875:85.

(175) For example, Aitken 1880:485. There are many references to this phenomenon, some well before Jackson's time: see, for example, Cheyne 1812:139.

(176) Fox 1874:223; Wilks & Moxon 1875:71-72.

(177) Broadbent, W.H. 1872:189.

(178) With the exception of a brief reference in the context of right hemisphere functions. See above, sub-section 5.6.5., p. 471.

(179) See above, sub-section 5.4.7., p. 443.

CHAPTER 6

CONCLUSIONS

6.1 It was during the 19th century that aphasia was established as a recognized clinical syndrome in medical theory in the British Isles. The term itself was first used in 1864. Prior to that, some of the main symptoms had been described and certain conclusions had been reached about the location of the lesion responsible for the "aphasia". Information about aphasia was widely disseminated in both the medical journals and medical textbooks, more particularly from 1864 onwards. The topic was also discussed, often at length, at meetings of various medical societies; on occasions, cases were demonstrated. Throughout the period under consideration, interest grew in other speech pathologies, especially stammering, but in the minds of the medical profession the major focus of attention was aphasia. Since the late 1860s it firmly established itself not as an esoteric form of disorder but as one that was liable to be met with relatively frequently in medical practices.

6.2 The study of aphasia in the British Isles between 1793 and 1894 fell into two major periods: pre-1864 and 1864 onwards. In the latter period, the direction of study was largely determined by the interpretations put on Broca's views on language-brain correlations. In the former, less specific factors appear to have been responsible for the interest in the subject, although between the 1820s and the 1840s an interest in phrenology on the part of certain clinicians led to some discussions of "aphasia" and of the cerebral localization of "language".

6.3 The study of the subject was not restricted to any one group of researchers, but attracted the attention of medical personnel throughout the British Isles. Inevitably, however, the weightier contributions came from clinicians attached to hospital practices and medical schools. Some of the major figures in 19th century British medicine took more than a passing interest in the subject.

There were two types of researcher: those who described cases and occasionally tried to interpret their findings in the light of a current view of neurolinguistic correlates, and, secondly, a smaller handful of clinicians, including Hughlings Jackson, Maudsley and Broadbent, who attached as much, if not more, importance to devising a satisfactory theoretical framework within which to describe and explain aphasia than to merely describing a series of individual cases.

6.4 In the fields of psychology and linguistics, a certain degree of awareness of aphasia was evident, but it was relatively small compared with the interest taken in the subject by doctors. No linguist, for example, ventured to describe a case of aphasia.

6.5 No researchers succeeded in establishing a relatively comprehensive and coherent hypothesis which gained wide acceptance. The considerable sympathy for Broca's viewpoint was, ironically, misdirected, since, with a few exceptions, the majority of clinicians did not properly understand it. At the basis of their misunderstanding was a distorted account of Broca in Trousseau's Lectures on Clinical Medicine.

6.6 The views of Hughlings Jackson on the nature of language and on aphasia were accorded exceptionally limited attention by his contemporaries. This was undoubtedly a reflection of their inherent difficulty rather than of disagreement on specific points.

6.7 In general, the influence on the study of aphasia of ideas about language from the fields of linguistics and psychology was limited. This was far more a reflection of the orientation of interest in these disciplines than of any unwillingness on the part of clinicians to familiarize themselves with the major categories of study within the disciplines. Bristowe was the only British clinician to use phonetic concepts to any great extent in the analysis and remediation of aphasic speech.

For the great majority of clinicians, aphasia was regarded as a disturbance or a complete loss of 'speech' or of the 'faculty of language'. Amongst a very small proportion of doctors, however, there existed a sharp awareness of the issues that were raised by using such terms. Jackson, in particular, saw clearly that it was critical to specify what was meant by terms such as 'language' and 'speech', to consider the constituents of language and to establish methods by which language might be analysed. For the most part, clinicians defined language (or at least explicated it) in terms of concepts such as 'sentence', 'word', 'syllable', 'letter', 'sound', 'thought' and 'will'.

6.8 It was accepted by a small proportion of clinicians that aphasia could not be satisfactorily explained without the prior establishment of a model of language processing. However, the intellectual justification for certain features of some of the models was never adequately argued. Some of the models discussed in the British literature were by British clinicians; others derived from the work of their French and German counterparts. Attempts to associate particular parts of the model with particular areas of the brain were sometimes devastatingly unsuccessful - witness the example of Bastian.

6.9 In general, the pattern of study was, firstly, to describe briefly some of the aphasic's symptoms, using mainly a restricted set of items from traditional grammar and from psychology; secondly, to provide a seemingly coherent explanation of them (for example, 'loss of the power of speech'); thirdly, from the 1860s onwards, to diagnose a particular type of aphasia; and, lastly, wherever possible to try to correlate the observed behavioural symptoms with post-mortem findings.

6.10 As the study of the subject progressed (especially from the 1860s onwards), aphasia was seen more and more as a subject of sometimes inexplicable complexity: it was difficult to describe and even harder to explain in other than the most general of terms. A trend that became evident, particularly in the 1870s and later, was not to describe the individual aphasic in any detail but to allocate him, instead, to a preconceived category of disturbance. It was only

Hughlings Jackson who challenged this view and who asked that each aphasic should be seen as an individual with certain retained linguistic capacities and many damaged ones, and not, semi-automatically, as a representative of a particular form of the condition.

Alongside this strong tendency to categorize before a searching linguistic examination had been carried out was the development of a rash of terminologies associated with aphasia: some were needed, others were simply fashionable jargon. Due to the growth in terminology, it was unfortunate that considerable misunderstandings arose over what were, in essence, crucial distinctions: that between 'aphasia' and 'aphemia', for example.

6.11 Almost without exception, the thrust of neurolinguistic studies lay in establishing correlations between linguistic symptoms and certain parts of the nervous system, with the emphasis on localizing the symptoms. Some suggestions were made as to the differential localization of specific grammatical features, but these were never developed to the extent that a hypothesis could be established.

6.12 As far as formulated theories of neurolinguistic functioning were concerned, the merit of Broca's hypothesis was that it was limited to but one aspect of speech production. This did not prevent it, however, from being accorded some overgenerous interpretations, not only by British clinicians but by their colleagues in other countries too. Ironically, the sense of unease about Broca's hypothesis that developed amongst British clinicians derived far more from post-mortem findings which were either equivocal or directly

hostile to his supposed views rather than to any conscious realisation that he had severely circumscribed the linguistic aspect of the hypothesis. In a nutshell: many clinicians believed that he was putting forward a hypothesis on the localization of "language" or, more specifically, of speech. They simply failed to understand that he was concerned only with the neuromuscular coordination of speech, nothing more. This led the majority of them to work on the assumption that the 'faculty of speech' or 'language' could be directly correlated with a particular area of the brain. If results were found that contradicted Broca's hypothesis, this must indicate, they argued, that Broca was wrong: the 'faculty of speech' was not in the posterior third of the left inferior frontal gyrus. They did not question whether their understanding of Broca's hypothesis was correct in the first place.

6.13 Until the 1860s, "aphasia" remained a single, undifferentiated phenomenon with many and varied manifestations: it was a disturbance of 'speech' or 'the power of speech' or the 'memory of words/names/ language'. Then, from the mid 1860s onwards, a distinction was drawn between two forms of "aphasia" which had until then been separated more on clinical than neurolinguistic grounds, 'aphasia' and 'dysarthria'. What was not distinguished from aphasia, however, - at least overtly - was the concept of dyspraxia. This is surprising, since as far as the motor mechanisms of speech were concerned, it already existed to some extent in the theory of aphemia as developed by Broca, and, as far as one can tell, in the concept of 'ataxy of articulation' as used by certain British clinicians.

6.14 The concept of agraphia was formally recognized during the late 1860s as a specific impairment by William Ogle.

6.15 Nothing comparable was established in the modalities of reading and gesture.

6.16 It was recognized as early as 1812 that aphasia could involve a disturbance of speech-comprehension, but it was not investigated such that a distinct syndrome of sensory aphasia (à la Wernicke) was established.

6.17 A variety of sub-types of aphasia were set up by a number of clinicians. Some of them, however, despite any theoretical attractions, were at odds with a good deal of received clinical opinion. In general, clinicians tended to make only a two-fold distinction: between amnesic and atactic aphasia.

6.18 Dysarthria, although existing in name from 1878 onwards, was not subjected to the same degree of sub-classification as aphasia.

6.19 It was recognized that it was rare for aphasia to occur in isolation. Usually associated with it were a number of other disorders, the most common of which was right-sided hemiplegia.

6.20 Prognosis in cases of aphasia was recognized to depend on a series of factors, including the extent of the damage, the age of the patient, his general health and the degree of self-motivation to

effect an improvement. In this connection, some attention was paid by clinicians to the question of how aphasics might be cured, or, at the very least, their symptoms might be alleviated.

6.21 The question of how the linguistic and, to some extent, psychological capacities of an aphasic might be assessed attracted a certain amount of attention, but never resulted in anything approaching the nature or number of the aphasia assessments in use today.

6.22 Opinions varied considerably on the location of "language" in the brain. A number of different areas were held to be in some (often unspecified) way involved in different modalities. These included parts of the left frontal lobe (especially the inferior frontal gyrus thereof) and the corpus striatum, and parts of the right hemisphere. Of the non-cortical areas, the olives were considered to play some part in speech production. Nevertheless, no consensus opinion emerged amongst clinicians, even about the role of the left inferior frontal gyrus; nor was any clinician able to specify in what precise way any particular area participated in an aspect of "language". The most sanguine attempt, that by Bastian, to relate particular areas to particular linguistic functions proved eventually to lack any substantial and unequivocal foundation. There did appear to be a measure of general agreement that sensory aphasia resulted from damage in the superior temporal gyrus.

6.23 Whereas the majority of clinicians envisaged aphasia being a behavioural disturbance arising from damage to brain-tissue, which at

post-mortem would turn out to be detectable, others were less dogmatic and considered that the aphasia could result from a transient or permanent disturbance of the electro-chemistry of the nervous system or of the nutritional supply to the cortex.

6.24 As with so much in the field during this period, many interesting and often subtle suggestions were made about neurolinguistics: what was lacking was any conscious attempt to synthesize them into a reasonably coherent and potentially valid theory. If the effort expended on testing Broca's hypothesis (or at least the form in which it was understood by most British clinicians) had been devoted to examining within a British context what he had actually proposed about neurolinguistic correlations, a way forward might have been found to discussing those aspects of language and the brain which he had deliberately excluded from his subject of study. In time, a more substantive hypothesis might well have been constructed from the results of various individual case-reports. As it was, the basic misunderstanding of Broca and the apparent inability to follow the threads of Jackson's views prevented the intensive development of a wider neurolinguistic theory.

6.25 Overall, there were few concerted and conscious attempts to grasp what today would be seen as the real nettle: the specific characteristics of the psycholinguistic deficits in aphasia. The prevailing climate of opinion throughout the whole of the 19th century and more particularly so from the 1870s onwards with the attention that was then being paid to questions of cerebral localization,

predisposed clinicians in general to direct their thoughts exclusively to the question of localization. Only Hughlings Jackson was able to look above and beyond this dominant view and see that the key question was not that of localization but of establishing all of the features in a neurolinguistic theory.

6.26 It may well be thought, then, that the subject-matter of 19th century studies of aphasia was too complex and intricate for any of the contemporary theories of language, language functioning and neurophysiology to be able to handle in any truly satisfactory manner. Put bluntly, the attempt to achieve a comprehensive understanding was, in many cases, premature in the light of the views that were current at the time in linguistics, psychology and neurology. Thus, the limited state of linguistic thinking in the 19th century on broad, general topics such as the specific form in which meaning is mediated by sound - in effect on semantics, grammar and, to a lesser extent, phonetics - made the task of the 19th century neurolinguist exceptionally difficult.

* * * * *

Over a hundred years ago, in 1878, Adolf Kussmaul described the aims of neurolinguistic studies in the following words: 'It will be the duty of science in the future to discover the cerebral tracts and centres through which the formation and comprehension of the various signs, phonetic and written words, numbers, gestures, and so on, are accomplished. It will also have to ascertain the minute and gross disturbances in the organic mechanism out of which the numerous forms of asemia spring'. This aim remains today precisely what it was in Kussmaul's time. The lessons, however, from the 19th century must be built on.

APPENDIX A

CHRONOLOGICAL LISTING OF CASE-REPORTS AND DISCUSSIONS OF "APHASIA", 1793 - 1894

NOTES FOR APPENDIX A ARE BETWEEN

PAGES 540 AND 541

'Date of Presentation' refers either to the date when a paper was read to a Society, or to the date when an article etc. was submitted for publication.

* before a date indicates that the publication of the article was spread over more than one issue of the journal.

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference		Number of Cases	Provenance of Case(s)
		1793	O'Halloran	1793	4	Limerick
		1796	Darwin	1796	2	Derby
		1797	Abernethy	1797	1	London
		1798	Crichton	1798	2	London
		1802	Beddoes	1802	3	Bristol
May 1806	College of Physicians, London	1813	Baillie	1813	1	London
		1809	Jones, R.	1809	1	Army
		1812	Cheyne	1812	11	Dublin
2 December 1814	College of Physicians, London	1815	Powell	1815	3	London
		1815	Abernethy	1815	2 (1 in 1797)	London
		1815	Watson, J.A.D.	1815	2	Royal Navy
		August 1816	Cross	1816	1	Glasgow
		1818	Abercrombie	1818a	3	Edinburgh
		1818	Abercrombie	1818b	9	Edinburgh
		1818	Hennen	1818	1	Waterloo
		1818	Watson, R.	1818	1	London
		1819	Abercrombie	1819a	3	Edinburgh
		1819	Abercrombie	1819b	7	Edinburgh
		1820	Cooke	1820	1	London
		1823	Ryan	1823	1	[See Note 1]
		1824	Anon.	1824	1	

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference		Number of Cases	Provenance of Case(s)
		1824	Basset	1824	1	London [See Note 2]
		1824	Combe, G.	1824		Edinburgh
		1824	Cooper	1824	3	London
		1824	Hood	1824	1	Kilmarnock
		1825	Hood	1825	1	Kilmarnock
		1825	N.	1825	1	Edinburgh
		1826	Hood	1826	1 (=1824)	Kilmarnock
		1826	Nicol	1826	2	Inverness
		1827	Bell, C.	1827	4	London
		1827	Broughton	1827	2	London
		1828	Abercrombie	1828	33	Edinburgh
		1828	Brodie	1828	1	London
		5 April 1828	Stanley	1828	1	London
		13 June 1829	Jackson, S.	1829	1	Philadelphia
		20 June 1829	Anon.	1829	1	
		1830	Abercrombie	1830	10 (1 in Abernethy 1797)	Edinburgh
		9 January 1830	Edinburgh University Clinic	1830	1	Edinburgh
		1830	Watson, H.C.	1830	1	Chapel-en-le-Frith
		1831	Bright	1831	10	London
	L'Université de Paris	2 March 1833	Andral	1833	3	Paris
		8 June 1833	Browne	1833	4	Stirling

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference		Number of Cases	Provenance of Case(s)
27 October 1833		1834	Otto	1834	1	Copenhagen
		October 1833	Syme	1833	1	Edinburgh
		November 1833	Osborne	1834	4	Dublin
		1833	Crampton	1833	1	Dublin
		January 1834	Anon.	1834	1	Edinburgh
5 November 1834		1836	Browne	1836	2	Edinburgh
		1834	Browne	1834		
		1834	Gregory	1834	1	
		1834	Roboüam	1834	1	Paris
2 May 1835		1835	Anon.	1835	1	
2 May 1835		1835	Ellis, A.	1835	1	Dublin
11 June 1835		1836	Gibson, W.	1836	1	Montrose
12 September 1835		1835	Grattan	1835	1	Belfast
		1836	Bell, C.	1836	7 (2 in Bell 1827)	London
		1836	Craig, J.	1836	1	Ratho
		1836	De Fouchy	1836	1	
		1836	Hall	1836	2 (1 in Bell 1836)	London
1836	Collège de France, Paris	24 June 1837	Magendie	1837	1	Paris
		1837	Bright	1837b	2	London
		1837	Shapter	1837	1	Exeter

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference		Number of Cases	Provenance of Case(s)
10 November 1838	Westminster Medical Society	17 November 1838	Westminster Medical Society	1838	2	London
		1838	Cowan	1838	1	
		1839	Smith, G.L. & Niddrie, D.	1839	1	Montrose
23 September 1840	3rd Annual Session of Phrenological Association, Glasgow	1841	Trevelyan	1841	1	Wallington
		1840	Hytchie	1840	1	
26 June 1842	5th Annual Session of Phrenological Association, London	1842	Stark	1842	1	Norwich
19 November 1842	Middlesex Hospital, London	3 December 1842	Watson, T.	1842	1	London
		22 January 1843	Levison	1843	1	Hull
		1843	Cheyne	1843	3	Dublin
		1843	Graves	1843	1	Dublin
		1843	Watson, T.	1843	3 (1 in Winslow 1860)	London
		29 June 1844	Turchetti	1844	1	Italy
		1 January 1845	Steele	1845	1	Dublin
		26 April 1845	Sayle	1845	3 (1 in Steele 1845)	Lynn
		April 1845	Kilgour	1845	1	Aberdeen
March/June 1845	Academie de Medecine, Paris	19 July 1845	Belhomme	1845	10	Paris
		* 15 November 1845	Dunn	1845	1	London
		* 29 November 1845	Dunn	1845	1	London

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference		Number of Cases	Provenance of Case(s)
		1845	Abercrombie	1845	35 (33 in Abercrombie 1828)	Edinburgh
		1845	Copeman	1845	40 (37 elsewhere)	Coltishall ; etc.
		18 September 1846	Chambers	1846	2	London
		4 March 1848	Tebay	1848	1	London
		1849	Bennett, J.R.	1849	1	London
		14 November 1849	Duncan	1849	1	Colchester
		23 February 1850	Allen	1850	1	London
25 June 1850	Royal Medical & Chirurgical Society, London	* 6 July 1850 *26 October 1850 * 2 November 1850	Dunn	1850	1	London
		1850	Copland	1850	1	London
		1851	Graves	1851	2	Dublin
		23 July 1853	Goolden	1853	4	London
		11 August 1854	Dunn	1854	1	London
		1854	Brodie	1854	3	London
		1854	Todd	1854	1	London
19 May 1855	Medical Society of London	1855	Dunn	1855a	1	London
		10 May 1856	Sedillot	1856	1	Strasbourg
	Pathological Society of London	26 March 1859	Ogle, J.W.	1859	1	London
		1859	Schroeder van der Kolk	1859	18	Utrecht, Dordrecht, Silesia, Paris, Dutch East Indies

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
		1860	Winslow 1860	39 (6 elsewhere)	London; etc.
		31 May 1862	Dunn 1862a	2	London
		9 August 1862	Gibson, D. 1862	1	Hull
		27 December 1862	Ramskill 1862	1	London
		30 January 1864	Jackson, J.H. 1864a	7	London
		30 April 1864	Jackson, J.H. 1864b	28	London
		21 May 1864	Jackson, J.H. 1864c	31	London
		9 July 1864	Welby 1864	1	London
		*23 July 1864	Russell, J. 1864a	39	Birmingham
		July 1864	Arlidge 1864		
		13 August 1864	Jackson, J.H. 1864d	1	London
		13 August 1864	Jackson, J.H. 1864e	1	London
		*20 August 1864	Russell, J. 1864a		Birmingham
		*27 August 1864	Russell, J. 1864a		Birmingham
		3 September 1864	Wilks 1864	1	London
		8 October 1864	Russell, J. 1864b	3	Birmingham
		26 November 1864	Jackson, J.H. 1864f	c.70	London
		26 November 1864	Jackson, J.H. 1864g	1	London
		3 December 1864	Russell, J. 1864c	2	Birmingham
		1864	Jackson, J.H. 1864h	30	London
		1 February 1865	Banks 1865	4	Dublin
		8 April 1865	Holthouse 1865	1	London

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
After 11 April 1865	County & City of Cork Medical & Surgical Society	August-November 1865	Popham 1865	1	Cork
		20 May 1865	Bateman 1865	1	Norwich
		1 July 1865	Anon. 1865a	1	France
		15 July 1865	Anon. 1865b		France
		1 August 1865	Moore, W.D. 1865	2	Dublin
		9 September 1865	Courties 1865	1	France
		9 September 1865	Russell, J. 1865	1	Birmingham
		9 September 1865	Jackson, J.H. 1865	1	London
After 13 September 1865	Glasgow Medico-Chirurgical Society	January 1866	Gairdner 1866	1	Glasgow
		1865	Hawkins 1865	1	London
7 February 1866	Medico-Chirurgical Society, Edinburgh	*24 February 1866 * March 1866	Sanders 1865-1866a	1	Edinburgh
7 February 1866	Medico-Chirurgical Society, Edinburgh	March 1866	Sanders 1865-1866b	1	Edinburgh
		17 February 1866	Jackson, J.H. 1866a	1	London
24 February 1866	Pathological Society, Dublin	August-November 1866	Banks 1866	1	Dublin
7 March 1866	Philosophical Society of Glasgow	1868	Gairdner 1865-1868		Glasgow
7 March 1866	Philosophical Society of Glasgow	1868	Sanders 1865-1868		Edinburgh
9 March 1866	Royal Medical Society of Edinburgh	October 1866	Anderson, J.K. 1866		Edinburgh

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
		1866	Trousseau 1866		France
		30 March 1866	Rev Trousseau 1866		
4 April 1866	Medico-Chirurgical Society, Edinburgh	1866	Tuke, J.B. 1865-1866	2	Edinburgh
7 April 1866	Pathological Society, Dublin	August-November 1866	Hayden 1866a	1	Dublin
		April 1866	Moxon 1866		London
10 April 1866	Medico-Chirurgical Society, Glasgow	May 1866	Gairdner 1866-1867	1	Glasgow
		14 April 1866	Dodgson 1866	1	Cockermouth
		28 April 1866	Jackson, J.H. 1866b		London
2 May 1866	Medico-Chirurgical Society, Edinburgh	June 1866	Sanders 1865-1866c	9	Edinburgh
		23 May 1866	Hayden 1866b	1	Dublin
		1 June 1866	Fayrer 1866a (see 1866c)		Calcutta
		2 June 1866	Russell, J. 1866	2	Birmingham
		16 June 1866	Sanders 1866 (see 1865-1866c)		Edinburgh
		23 June 1866	Jackson, J.H. 1866c		London
		1 July 1866	Palmer, W.J. 1866	2	Calcutta
		1 July 1866	Fayrer 1866b (see 1866c)		Calcutta
		7 July 1866	Anon. 1866b	1	France
		*28 July 1866	Jackson, J.H. 1866d	1	London
		1866	Wilks 1866	4	London

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference		Number of Cases	Provenance of Case(s)
31 July 1866	Medico-Psychological Association, Edinburgh	January 1867	Robertson, A.	1867a	3 (see also Young, J. et al. 1870)	Glasgow
		August 1866	Begbie & Sanders	1866	3	Edinburgh
		11 August 1866	Fox	1866	14	Bristol
		25 August 1866	Jackson, J.H.	1866e		London
		* 1 September 1866	British Medical Journal	1866		
		*15 September 1866	British Medical Journal	1866		
		*22 September 1866	Jackson, J.H.	1866d		London
		September 1866	Barclay	1866	1	Banff
		November 1866	Fayrer	1866c	1	Calcutta
		1 December 1866	Jackson, J.H.	1866f		London
		1866	Mushet	1866		London
		1866	Skae	1866		Edinburgh
		1866	Wilks	1866		London
		1867	Power, H. et al.	1867		London
15 January 1867	Pathological Society of London	1867	Ogle, W.	1867a	21	London
		January 1867	Scoresby-Jackson	1867a	4	Edinburgh
		February 1867	Scoresby-Jackson	1867b	2	Edinburgh
7 May 1867	Pathological Society of London	1867	Thurnam	1867	1	Devizes
		20 July 1867	Jackson, J.H.	1867a		London
		1 August 1867	Popham	1867	7 (5 in Bright 1831)	Cork ; London

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
		August 1867	Robertson, A. 1867b	1	Glasgow
		31 August 1867	Bramwell, J.R. 1867	1	Perthshire
		26 October 1867	Peacock 1867	4	London
August 1867	Annual Meeting of B.M.A., Dublin	9 November 1867	Bateman 1867	3	Norwich
		30 November 1867	Jackson, J.H. 1867b	2	London
		21 December 1867	Simpson 1867	1	Gloucester
		1867	Callender 1867 & 1869	3	London
		1867	Ogle, J.W. 1867	1	London
		1867	Ogle, W. 1867b	25	London
		1868	Dunn 1867-1868		London
		1868	Jackson, J.H. 1867-1868	30	London
		January 1868	Bateman 1868a	14	[Foreign literature]
		18 January 1868	Wilks 1868		London
		25 January 1868	Bruce 1868	1	Peterhead
		7 March 1868	Jackson, J.H. 1868a	1	London
		*21 March 1868	Ogle, J.W. 1868a	22	London
		4 April 1868	Jackson, J.H. 1868b		London
		April 1868	Bateman 1868b	47	[British & foreign literature]
		6 June 1868	Moore, W.D. 1868	1	Dublin
		*25 July 1868	Ogle, J.W. 1868a		London

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
August 1868	British Association for Advancement of Science Meeting, Norwich	5 September 1868	Bateman 1868c	27	Norwich etc.
	" " " " " "	5 September 1868	Broca 1868b		Paris
		*5 September 1868	Dunn 1869	2	London
		5 September 1868	Jackson, J.H. 1868c		London
		19 September 1868	Lancet 1868		
		26 September 1868	Jackson, J.H. 1868d		London
		October 1868	Bateman 1868d	7	Norwich
		3 October 1868	Sumpter 1868	2	Cley-next-the-Sea
		7 November 1868	Jackson, J.H. 1868e		London
		August-November 1868	Oedmansson 1868		Stockholm
9 November 1868	Medical Society of London	*28 November 1868	Maudsley 1868		London
		* 5 December 1868	Maudsley 1868		London
			Cadge 1868		Norwich
			Copeman 1868		Norwich (see Note 3)
		1868	Ogle, W. 1868	6	London
		*1868	Hunt 1868-1869		London
		*1869	Hunt 1868-1869		London
		1869	Power, H. et al. 1869		London
		January 1869	Bateman 1869a		Norwich
		*January 1869	Bastian 1869b	1	London
		23 January 1869	Marcet, W.M. 1869	1	Brompton

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
August 1868	British Association for Advancement of Science Meeting, Norwich	*30 January 1869	Dunn 1869		London
26 November 1868	East Kent Medical Meeting, Canterbury	27 February 1869	Roscoe 1869		? Manchester
1 February 1869	Medical Society of London	* 8 May 1869	Bateman 1869c	1	Norwich
22 February 1869	Medical Society of London	20 March 1869	Day 1869	5	Stafford
		6 March 1869	Jackson, J.H. 1869		London
10 March 1869	Cork Pathological & Medical Society	1869	Luther 1868-1869	1	Cappoquin
		April 1869	Bateman 1869b		Norwich
		*April 1869	Bastian 1869b		London
		8 May 1869	Allbutt 1869	1	Leeds
		*22 May 1869	Bateman 1869c		Norwich
		19 June 1869	Alcock 1869		Army
		19 June 1869	Page & Jackson, J.H. 1869	1	London
		7 August 1869	Anon. 1869	1	London
		21 August 1869	Nicholls 1869	2	Chelmsford
		2 October 1869	Atkinson 1869		London
		October 1869	Bateman 1869d		Norwich
		1 November 1869	Fayrer 1869	1	India
		20 November 1869	Sumpter 1869a (see 1868)		Cley-next-the-Sea

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
		4 December 1869	Sumpter	1869b (see 1868)	Cley-next-the-Sea
		1869	Callender	1867 & 1869 13	London
		1869	Carpenter (ed.Power, H.)	1869	London
		1869	Wadham	1869 1	London
		1870	Lawrence	1869 1	Montrose
7 January 1870	Medico-Chirurgical Society of Glasgow	February 1870	Young, J. et al.	1870 1 (see Robertson, A. Glasgow 1867a)	
		8 January 1870	Atkinson	1870a	London
		*8 January 1870	v.Niemeyer	1870 1	Tübingen
		*15 January 1870	v.Niemeyer	1870	Tübingen
		*22 January 1870	v.Niemeyer	1870	Tübingen
		12 February 1870	Russell, J.	1870a 1	Birmingham
25 February 1870	Clinical Society of London	19 March 1870	Bristowe	1870a 1	Canada
		9 March 1870	Cleland	1870 1	Galway
		2 April 1870	Russell, J.	1870b 2	Birmingham
		9 April 1870	Murchison	1870 1	London
		11 June 1870	Bateman	1870	Norwich
		11 June 1870	Rev Bateman	1870	
		*23 July 1870	Ogle, J.W.	1870 32	London etc.
		*17 September 1870	Ogle, J.W.	1870	London etc.
		17 September 1870	Habershon	1870 1	London

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference		Number of Cases	Provenance of Case(s)
		*24 September 1870	Thacker	1870		Cincinatti
		*1 October 1870	Thacker	1870		Cincinatti
		29 October 1870	Jackson, J.H.	1870a		London
		29 October 1870	Jackson, J.H.	1870b		London
		October 1870	Atkinson	1870b		London
		3 December 1870	Buzzard	1870	1	London
9 December 1870	West Kent Medico-Chirurgical Society	4 February 1871	Bristowe	1871a		London
		1870	Bristowe	1870b		London
		1870	Wilks	1870		London
		*14 January 1871	Druitt	1871	3	London
		*21 January 1871	Druitt	1871		London
		*4 February 1871	Druitt	1871		London
		11 February 1871	Laycock	1871		Edinburgh
	Medico-Chirurgical Society of Glasgow	February 1871	Robertson, A.	1871	2	Glasgow
		18 March 1871	Jackson, J.H.	1871a		London
5 April 1871	Manchester Medical Society	13 May 1871	Haddon	1871	1	Manchester
		3 June 1871	Spectator	1871		
		17 June 1871	Bateman	1871		Norwich
		17 June 1871	Jackson, J.H.	1871b	1	London

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
		24 June 1871	MacKenzie 1871	1	London
		24 June 1871	Lancet 1871		
		August 1871	Anderson, M. 1871	1	Glasgow
		August 1871	Rev Bateman 1870		
		16 September 1871	Rev Hammond 1871		
		23 September 1871	Jackson, J.H. 1871c	1	London
		30 September 1871	Bacon 1871	1	Cambridge
		28 October 1871	Lush 1871	1	Weymouth
		*18 November 1871	Althaus 1871	2	London
		*25 November 1871	Althaus 1871		London
6 December 1871	Manchester Medical Society	*3 February 1872	Ransome 1872		Manchester
		*2 March 1872	Ransome 1872		Manchester
24 November 1871	Clinical Society of London	9 December 1871	Glover 1872 (see also Glover 1873)		London
		23 December 1871	Power, R.E. 1871	1	Dartmoor
		23 December 1871	Jackson, J.H. 1871d	1	London
		1871	Bristowe 1871b	13	London
		1871	Watson, T. 1871	3	London
		20 January 1872	Jackson, J.H. 1872a	1	London
		January 1872	Tuke, J.B. & Fraser 1872a	1	Edinburgh
7 February 1872	Medico-Chirurgical Society of Edinburgh	April 1872	Tuke, J.B. & Fraser 1872b	1	Edinburgh

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference		Number of Cases	Provenance of Case(s)
7 February 1872	Medico-Chirurgical Society of Edinburgh	30 March 1872	Tuke, J.B.	1872	1	Edinburgh
13 February 1872	Royal Medical & Chirurgical Society	24 February 1872	Broadbent, W.H.	1872	10	London
5 March 1872	Pathological Society of London	1872	Greenhow	1872	1	London
18 March 1872	Victoria Institute	1872	Bateman	1872		Norwich
16 April 1872	Pathological Society of London	1872	Bristowe	1872		London
		4 May 1872	Jackson, J.H.	1872b	1	London
		15 June 1872	Clarke, J.L.	1872	1	London
		July 1872	Robertson, A.	1872		Glasgow
		July 1872	Wilks	1872a		London
		13 July 1872	Haynes	1872	1	Malvern
		19 October 1872	Fuller	1872	1	London
		16 November 1872	McCarthy	1872	1	London
		30 November 1872	Jackson, J.H.	1872c	1	London
		1872	Browne	1872		[British literature]
		1872	Tuke, D.H.	1872		Falmouth
		1872	Wilks	1872b	1	London
		*18 January 1873	Jackson, J.H.	1873a		London
		*1 February 1873	Jackson, J.H.	1873a		London
28 February 1873	Clinical Society of London	15 March 1873	Glover	1873	1 (see Glover 1872)	London

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference		Number of Cases	Provenance of Case(s)
		15 May 1873	Molony	1873	1	Dublin
		17 May 1873	Jefferiss	1873	1	Lairg
		24 May 1873	Anon.	1873		
		*31 May 1873	Grasset	1873	1	France
		14 June 1873	Dowse	1873	1	London
		*19 July 1873	Grasset	1873		France
		19 July 1873	Jones, C.H.	1873	1	London
		26 July 1873	British Medical Journal	1873		
		26 July 1873	Curran	1873	1	Mansfield Woodhouse
		1 October 1873	Martin	1873	1	Portlaw
		15 October 1873	Yeo	1873	3	Dublin
		1873	Arnould	1873	1	London
		1873	Fayrer	1873	3 (1 in 1866a,b,c)	Calcutta
		1873	Jackson, J.H.	1873b		London
		1873	Ord	1873		London
		17 January 1874	Spectator	1874	1 (see Arnould 1873)	
		*14 January 1874	Jackson, J.H.	1874a		London
		*21 January 1874	Jackson, J.H.	1874a		London
		*28 January 1874	Jackson, J.H.	1874a		London
		5 March 1874	Ferrier, D.	1874a		London
		14 March 1874	Clarke, J.L.	1874	1	London
		28 March 1874	Ogle, J.W.	1874a	1	London

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
		4 April 1874	Jones, C.H. 1874	1	London
		18 April 1874	Robertson, A. 1874	1	Glasgow
		2 May 1874	Jackson, J.H. 1874b	1	London
		2 May 1874	Shaw, T.C. 1874	1	London
		30 May 1874	Jones, E.S. 1874	1	Weston-super-Mare
		20 June 1874	Jackson, J.H. 1874c	1	London
		4 July 1874	Coupland 1874	1	Germany
		*11 July 1874	Russell, J. 1874	1	Birmingham
		July 1874	Mickle 1874	1	London
		8 August 1874	Ogle, J.W. 1874b		London
August 1874	Annual Meeting of B.M.A., Norwich	29 August 1874	Ferrier, D. 1874c		London
" " " "	" " " " " " "	" " " "	Bateman 1874		Norwich
" " " "	" " " " " " "	" " " "	Tuke, J.B. 1874		Edinburgh
" " " "	" " " " " " "	" " " "	Dowse 1874		London
" " " "	" " " " " " "	" " " "	Eade 1874		Norwich
24 September 1874	East Kent District Meeting (BMA South-Eastern Branch)	17 October 1874	Raven 1874	2	Broadstairs
22 October 1874	BMA Bristol & Bath Association Meeting	1876	Davey 1876		Bristol
		*24 October 1874	Russell, J. 1874	4 (1 in Hennen 1818)	Birmingham
		19 December 1874	Stassin 1874	1	? Germany

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
		1874	Dunglison 1874		Philadelphia
		1874	Ferrier, D. 1874b	1	London
		1874	Forster 1874	1	London
		1874	Fox 1874		Bristol etc.
		30 January 1875	Coats 1875	1	Glasgow
9 February 1875	Glasgow Pathological & Clinical Society	1 May 1875	Gairdner et al. 1875	1 (=Robertson, A. 1871)	Glasgow
27 February 1875	Dublin Pathological Society	2 August 1875	Little 1875	1	Dublin
		April 1875	Bastian 1875	2	London
		1 May 1875	Cheadle 1875	4	London
		19 June 1875	Voisin 1875		Paris
		July 1875	Jackson, J.H. 1875		London
4 August 1875	Annual Meeting of BMA, Edinburgh	28 August 1875	Hovell, D.de B. 1875	1	London
		4 September 1875	Glissan 1875	1	Brynmawr
		18 September 1875	Thomas 1875	1	London
		October 1875	Clouston 1875	2	Edinburgh
		October 1875	Shearer 1875	1	Liverpool
18 December 1875	Dublin Pathological Society	1 May 1876	Benson 1876	1	Dublin
		1875	Bastian 1875	3	London
		1875	Tanner 1875		London
		1875	Wilks 1875	3	London

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference		Number of Cases	Provenance of Case(s)
		29 January 1876	Anon.	1876	1 (see Coupland 1874)	Germany
8 February 1876	Glasgow Pathological & Clinical Society	8 April 1876	Finlayson	1876a	1 (see 1876b Case 1)	Glasgow
		9 February 1876	Thornley	1876	1	Leicester
		April 1876	Clouston	1876		Edinburgh
		6 May 1876	Sutherland	1876	1	London
		15 July 1876	Wilson, J.	1876a	1	Worcester
		29 July 1876	Broadbent, W.H.	1876	(see Wilson, J. 1876a)	
		5 August 1876	Wilson, J.	1876b	(see Broadbent, W.H. 1876)	
		September 1876	Finlayson	1876b	3 (1 in 1876a)	Glasgow
		*23 September 1876	Jaccoud	1876		Paris
		*30 September 1876	Jaccoud	1876		Paris
		*14 October 1876	Jaccoud	1876		Paris
		October 1876	Atkins	1876	1 (see also Atkins 1878)	Cork
		October 1876	Schlangenhausen	1876		Vienna
		*23 November 1876	Lewes	1876		London
27 November 1876	King's & Queen's College of Physicians, Dublin	1 March 1877	Brown-Séquard	1877a		Brighton
		*30 November 1876	Lewes	1876		London
		1876	Bristowe	1876		London
		1876	Ferrier, D.	1876		London
		1876	Jackson, J.H.	1876		London

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
		6 January 1877	Weber 1877	1	London
		13 January 1877	Jackson, J.H. 1877	1	London
		January 1877	Tamburini 1877	331	Italy
14 May 1877	Dublin Pathological Society	1 November 1877	McDonnell 1877	1	Dublin
		2 June 1877	Anon. 1877		
		*7 July 1877	Dupuy 1877		New York
		*14 July 1877	Dupuy 1877		New York
		21 July 1877	Brown-Séquard 1877b		Brighton
		26 July 1877	Robinson 1877	1	London
		28 July 1877	Barlow 1877	1	London
		*28 July 1877	Dupuy 1877		New York
10 August 1877	Annual Meeting of BMA, Manchester	*4 May 1878	Atkins 1878	1 (see Atkins 1876)	Waterford
		*11 May 1878	Atkins 1878		Waterford
" " " "	" "	" " " " " " " " "	25 August 1877 Drysdale 1877	1	London
		15 September 1877	British Medical Journal 1877		
		*29 September 1877	Dupuy 1877		New York
		6 October 1877	O'Neill 1877	1	Lincoln
		6 October 1877	Fournier 1877		France
		October 1877	Schlangenhausen 1877	1	Vienna
		October 1877	Spamer 1877		Germany
		*3 November 1877	Dupuy 1877		New York

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		1877	Bateman 1877		Norwich
		24 January 1878	Lewis & Clarke, H. 1878		Wakefield
		*January 1878	Dodds 1878		Montrose
		January 1878	Savage 1878	1	London
		1878	Wilks 1878	3 (=Wilks 1875)	London
26 February 1878	Royal Medical & Chirurgical Society, London	1878	Broadbent, W.H. 1878a	1	London
		*9 March 1878	Treves 1878	1	Wirksworth
		*16 March 1878	Treves 1878		Wirksworth
20 March 1878	Goulstonian Lecture	6 April 1878	Ferrier, D. 1878		London
		30 March 1878	Dale 1878	1	King's Lynn
		April 1878	Billod 1878	1	France
		*April 1878	Dodds 1878		Montrose
		April 1878	Gallopain 1878		France
		April 1878	Rev Wilks 1878		
		18 May 1878	Jackson, J.H. 1878		London
		15 June 1878	Wiart 1878		Germany
		*July 1878	Dodds 1878		Montrose
		July 1878	MacCormac 1878	1	London
		28 September 1878	Küssner 1878	1	Germany
		28 September 1878	Schwartz 1878	1	Germany
		September 1878	Lindsay 1878	2	Perth

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		1878	Kussmaul 1878		Strassburg
		October 1878	Rev Kussmaul 1878		
8 October 1878	Glasgow Pathological & Clinical Society	16 November 1878	Robertson, A. 1878a	2	Glasgow
8 October 1878	Glasgow Pathological & Clinical Society	December 1878	Robertson, A. 1878b		Glasgow
		* October 1878	Jackson, J.H. 1878-1880		London
		1878	Broadbent, W.H. 1878b	4	London
		1878	Moore, N. 1878	2	London
		January 1879	Broadbent, W.H. 1879	1	London
		January 1879	Rev Bateman 1877		
		January 1879	Marandon de Montyel 1879	1	France
		*8 February 1879	Magnan 1879a	2	Paris
		15 March 1879	Foulis 1879	1	Glasgow
26 March 1879	Medico-Psychological Association	May 1879	Johnstone 1879	1	Fife
April 1879	Lumleian Lecture	*10 May 1879	Bristowe 1879	4	London
May 1879	Lumleian Lecture	*17 May 1879	Bristowe 1879		London
		*19 April 1879	Magnan 1879a		Paris
		April 1879	Magnan 1879b	4	Paris
		3 May 1879	Moffat 1879	1	Motherwell
		*July 1879	Jackson, J.H. 1878-1880		London
		*3 September 1879	Jackson, J.H. 1879		London

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		*17 September 1879	Jackson, J.H.	1879		London
		*1 October 1879	Jackson, J.H.	1879		London
		*October 1879	Jackson, J.H.	1878-1880		London
		*12 November 1879	Jackson, J.H.	1879		London
		*19 November 1879	Jackson, J.H.	1879		London
		11 October 1879	Lewandowski et al.	1879	2	Poland, France
		1879	Calderwood	1879		Edinburgh
	Philadelphia County Medical Society	1879	Mills	1879	4	United States, France
		6 March 1880	Jacob	1880	1	Leeds
		24 April 1880	Jackson, J.H.	1880	1	London
13 August 1880	Annual Meeting of BMA, Cambridge	28 August 1880	Moorhead	1880	1	Weymouth
26 November 1880	Clinical Society of London	1881	Taylor, F.	1881	1	London
		27 November 1880	Anon.	1880	1	
		27 November 1880	Brown, W.H.	1880	1	Leeds
10 December 1880	Clinical Society of London	*25 December 1880	Habershon	1881	1	London
		*1 January 1881	Habershon	1881		London
		1880	Aitken	1880		Southampton
		29 October 1881	Boyd	1881	2	London
		29 October 1881	Weekes	1881	1	York
		26 November 1881	Ross	1881a	1	Manchester

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		3 December 1881	Chauffard 1881	1	France
		1881	Charcot 1881	1	Paris
		1881	Luys 1881	1	Paris
		1881	Ranney 1881		New York
		1881	Ross 1881b		Manchester
		1881-1899	Power, H. & Sedgwick 1881-1899		London
8 March 1882	Medico-Psychological Association Meeting, Glasgow	July 1882	Mitchell 1882	1	Fife
14 March 1882	Glasgow Pathological & Clinical Society	13 May 1882	Fraser & Gairdner 1882	2	Glasgow
		July 1882	Shaw, J. 1882	1	Newton-le-Willows
		21 October 1882	Brissaud 1882		France
		1882	Bastian 1882a		London
		1882	Bastian 1882b		London
		7 April 1883	McK- 1883	1	
		14 July 1883	Charcot 1883	1	Paris
August 1883	Annual Meeting of BMA, Liverpool	18 August 1883	Gairdner 1883		Glasgow
" " " "	" " " " " " " " "	18 August 1883	Jackson, J.H. 1883		London
" " " "	" " " " " " " " "	18 August 1883	Broadbent, W.H. 1883		London
" " " "	" " " " " " " " "	18 August 1883	Allbutt 1883		Leeds
" " " "	" " " " " " " " "	18 August 1883	Ireland 1883		Prestonpans
" " " "	" " " " " " " " "	18 August 1883	Drummond 1883		Newcastle-upon-Tyne

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August 1883	Annual Meeting of BMA, Liverpool	18 August 1883	Ross 1883		Manchester
" " " "	" " " " " " " " " "	18 August 1883	Woods 1883		Southport
" " " "	" " " " " " " " " "	18 August 1883	Cameron 1883	3	Liverpool
" " " "	" " " " " " " " " "	18 August 1883	Hovell, T.M. 1883	1	London
		22 September 1883	Robertson, A. 1883		Glasgow
		*26 September 1883	Charcot 1883-1884		Paris
		*3 October 1883	Charcot 1883-1884		Paris
		*10 October 1883	Charcot 1883-1884		Paris
		*17 October 1883	Charcot 1883-1884		Paris
		*24 October 1883	Charcot 1883-1884		Paris
26 October 1883	Clinical Society of London		Turner, G.R. 1887	1	London
		24 November 1883	Copland 1883	1	Dunedin
		24 November 1883	Mallins 1883	1	Watton
		1 December 1883	Anon. 1883	1	France
		1883	Gerdts 1883		Germany
		1883	Wilks 1883		London
		*9 January 1884	Charcot 1883-1884		Paris
20 February 1884	Manchester Medical Society	15 March 1884	Ross 1884a	3	Manchester
20 February 1884	Manchester Medical Society	15 March 1884	Wahltuch 1884	1	Manchester
		1 March 1884	Schofield 1884	2	London

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		24 May 1884	Stewart 1884a	4(see 1884b)	Edinburgh
10 June 1884	Royal Medical & Chirurgical Society of London	1884	Broadbent, W.H. 1884	2	London
4 September 1884	Brighton & Sussex Medico-Chirurgical Society	27 September 1884	Verrall 1884	1	Brighton
		10 September 1884	Jackson, J.B. 1884	1	Truro
5 November 1884	Manchester Medical Society	6 November 1884	Ross 1884b		Manchester
		11 November 1884	Lancet 1884	1 (see Dunoyer 1886)	
		1884	Stewart 1884b	4	Edinburgh etc.
12 January 1885	Medical Society of London	17 January 1885	West, S. 1885	1	London
		January 1885	Lichtheim 1885	5	Bern
		January 1885	Marshall, J.N. 1885	1	Glasgow
5 February 1885	Liverpool Medical Institution	4 March 1885	Archer 1885	1	Liverpool
		11 April 1885	Chevers 1885		India
		11 April 1885	ππ 1885		
		6 June 1885	Flynn 1885	1	Sunderland
		20 June 1885	Féré 1885	1	France
		8 August 1885	Lancet 1885		
25 September 1885	BMA South-Eastern Branch, East Sussex District	10 October 1885	Verrall 1885	1	Brighton
		10 October 1885	S..., B. 1885	1	

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
		10 October 1885	Turner, J. 1885	1	Colchester
30 October 1885	BMA Birmingham & Midland Counties Branch, Pathological & Clinical Section	14 November 1885	Suckling 1885	1	Birmingham
		October 1885	Beveridge (and Ross & Gairdner) 1885	1	Glasgow
		14 November 1885	Lloyd 1885	1	Birmingham
		28 November 1885	Anon. 1885	1	
		1885	Meynert 1885		Vienna
9 December 1885	Midland Medical Society	2 January 1886	Simon 1886	1	Birmingham
		2 January 1886	Cremen 1886	1	Cork
		January 1886	Dingley 1886	1	Wolverhampton
		*January 1886	Ross 1886	11	Manchester
		*February 1886	Ross 1886		Manchester
		27 February 1886	Bramwell, H.R. 1886	1	Edinburgh
		February 1886	Dunoyer 1886	1	France
		*March 1886	Ross 1886		Manchester
		10 April 1886	Jackson, J.H. 1886	1	London
		10 April 1886	Suckling 1886	2	Birmingham
		*April 1886	Ross 1886		Manchester
		29 May 1886	Rev Bernard 1886		
		*May 1886	Ross 1886		Manchester
		19 June 1886	Pope & Godlee 1886	1	London

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		June 1886	Ross 1886		Manchester
		17 July 1886	Wiglesworth 1886	1	Rainhill
		*July 1886	Ross 1886		Manchester
		*August 1886	Ross 1886		Manchester
		*September 1886	Ross 1886		Manchester
		16 October 1886	Staubback & de Watteville 1886	1	London
		*October 1886	Ross 1886		Manchester
		October 1886	Windle 1886	1	Birmingham
		6 November 1886	Kast 1886	1	Germany
		*November 1886	Ross 1886		Manchester
		1886	Ferrier, D. 1886		London
14 January 1887	Clinical Society of London	22 January 1887	Crocker 1887	1	London
14 January 1887	Clinical Society of London	22 January 1887	West, S. 1887	1	London
14 January 1887	Medico-Chirurgical Society of Glasgow	April 1887	Robertson, A. 1887	1	Glasgow
		15 January 1887	Turner, G.R. 1887	1	London
		After February 1887	Suckling 1887a	2	Birmingham
23 May 1887	Glasgow Pathological & Clinical Society	October 1887	Fraser, 1887	1	Paisley
1 June 1887	Medico-Chirurgical Society of Edinburgh	1888	Bramwell, B. 1888	2	Edinburgh
		July 1887	Daly 1887	1	Hull

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August 1887	Annual Meeting of BMA, Dublin	13 August 1887	Gairdner 1887		Glasgow
" " "	" " " " " " " " "	*29 October 1887	Bastian 1887b		London
" " "	" " " " " " " " "	*5 November 1887	Bastian 1887b		London
" " "	" " " " " " " " "	4 February 1888	Bateman 1888	1	Norwich
		24 September 1887	White, H. 1887	1	London
10 November 1887	Medico-Psychological Association Meeting, Edinburgh	April 1888	Robertson, G.M. 1888		Edinburgh
7 December 1887	Midland Medical Society	*31 December 1887	Suckling 1887b	1	Birmingham
		*15 September 1888	Suckling 1887b		Birmingham
		10 December 1887	Paget 1887	1	Cambridge
		1887	Ross 1887	11 (see Ross 1886)	Manchester
		24 December 1887	Rev Ross 1887		
		1887	Bateman 1887	2	Norwich
		1887	Ladd 1887		Yale
27 January 1888	Medico-Chirurgical Society of Glasgow	March 1888	Thomson, R.S. 1888	1	Glasgow
		18 February 1888	Bennett, A.H. 1888	3	London
		25 February 1888	Orton 1888	1	Newcastle-under-Lyme
9 March 1888	Royal Academy of Medicine in Ireland	7 April 1888	Ball, C.B. 1888	1	Dublin
		7 July 1888	Francis 1888	3	Northampton
		9 August 1888	Macewen 1888		Glasgow

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
18-20 September 1888	Congress of American Physicians & Surgeons, Washington, D.C.	7 November 1888	Starr 1888		New York
16 October 1888	Abernethian Society	1889	Cautley 1889		London
21 November 1888	BMA Aberdeen, Banff & Kincardine Branch	12 January 1889	Smith, P.B. 1889	1	Aberdeen
6 December 1888	Liverpool Medical Institution	22 December 1888	Bradshaw 1888	2	Liverpool
		12 December 1888	Holmes 1888	1	Sheffield
		1888	Bristowe 1888	(See 1870a)	London
		1888	Foster, F.P. 1888		New York
		1888	Gowers 1888		London
		1888	Roberts 1888		London
		1888	Rosse 1888		Washington, D.C.
		19 January 1889	Tooth 1889	1	London
21 February 1889	BMA Southern Branch, South-East Hants. District	16 March 1889	Emmett 1889	2	Portsmouth
		July 1889	Starr 1889	50	New York
	BMA Birmingham Branch, Clinical & Pathological Section	October 1889	Wilson, T.S. 1889	1	Birmingham
19 December 1889	Liverpool Medical Institution	January 1890	Glynn 1890	1	Liverpool
		1889	Charcot 1889	1	Paris
		1889	Bateman 1889	4	Norwich etc.
		1889	Wagstaffe 1889		Sevenoaks

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
22 January 1890	Midland Medical Society	8 February 1890	Suckling 1890a	1	Birmingham
7 February 1890	Leeds & West Riding Medico-Chirurgical Society	22 February 1890	Jacob 1890a	2	Leeds
		24 May 1890	Poole 1890	1	Poulton-le-Fylde
		31 May 1890	Bastian 1890		London
10 June 1890	Anthropological Institute	1891	Hollander 1891		Vienna
		After July 1890	Suckling 1890b		Birmingham
		13 September 1890	Jacob 1890b	3	Leeds
		1890	Bateman 1890		Norwich etc.
		*25 October 1890	Rev Bateman 1890		
		* 1 November 1890	Rev Bateman 1890		
19 December 1890	Royal Academy of Medicine in Ireland	17 January 1891	Beatty 1891	1	Dublin
		1890	Beevor 1890		London
		1890	Bevan 1890	8	Huddersfield
		1890	Billings 1890		United States
		1890	Westbrook 1890		New York
*18 February 1891	Midland Medical Society	*14 March 1891	Wilson, T.S. 1891	1	Birmingham
* 1 April 1891		* 2 May 1891	Wilson, T.S. 1891		Birmingham
		*October 1891	Wyllie 1891-1894		Edinburgh
	Clinical Society of Manchester	28 November 1891	Reynolds, E.S. 1891	1	Manchester

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
		*November 1891	Wyllie 1891-1894		Edinburgh
		1891	Mills 1891	1	Philadelphia
		1891	Ladd 1891		Yale
		*December 1891	Wyllie 1891-1894		Edinburgh
		9 January 1892	Dobie 1892	1	Coldstream
22 January 1892	Clinical Society of London	30 January 1892	Hadden 1892	1	London
		*January 1892	Wyllie 1891-1894		Edinburgh
		27 February 1892	Shaw, E.A. 1892	1	Wakefield
		*February 1892	Wyllie 1891-1894		Edinburgh
		*March 1892	Wyllie 1891-1894		Edinburgh
6 April 1892	Midland Medical Society	21 May 1892	Suckling 1892	1	Birmingham
		*April 1892	Wyllie 1891-1894		Edinburgh
		*May 1892	Wyllie 1891-1894		Edinburgh
		25 June 1892	Combemale 1892	1	France
July 1892	Annual Meeting of BMA, Nottingham	10 September 1892	Delépine 1892	1	Manchester
		1892	Whitaker 1892		London
		February 1893	Fraser 1893	2	Paisley
		*February 1893	Wyllie 1891-1894		Edinburgh
27 March 1893	Medical Society of London	1 April 1893	Beevor 1893	1	London
		*March 1893	Wyllie 1891-1894		Edinburgh

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
		*April 1893	Wyllie 1891-1894		Edinburgh
4 May 1893	London	*17 May 1893	Bastian 1893a	6	London
		20 May 1893	Giampietro 1893		Naples
		*23 May 1893	Bastian 1893a		London
		May 1893	Reynolds, E.S. 1893	3	Manchester
		*June 1893	Wyllie 1891-1894		Edinburgh
		*July 1893	Wyllie 1891-1894		Edinburgh
		30 August 1893	Jackson, J.H. 1893		London
		*August 1893	Wyllie 1891-1894		Edinburgh
		*September 1893	Wyllie 1891-1894		Edinburgh
13 October 1893	Leeds & West Riding Medico-Chirurgical Society	28 October 1893	Mantle 1893	1	Halifax
		*October 1893	Wyllie 1891-1894		Edinburgh
		*November 1893	Wyllie 1891-1894		Edinburgh
		*December 1893	Wyllie 1891-1894		Edinburgh
		1893	Gowers 1893		London
		1893	Shaw, E.A. 1893	12	Royal Navy etc.
4 January 1894	Harveian Society of London	20 January 1894	Lockwood 1894	2	London
		6 January 1894	Waldo 1894	1	Bristol
		13 January 1894	Chantemesse 1894		France
		*January 1894	Wyllie 1891-1894		Edinburgh

Date of Presentation	Place of Meeting	Date of Publication	Author & Bibliographical Reference	Number of Cases	Provenance of Case(s)
23 February 1894	Clinical Society of London	3 March 1894	Sansom 1894	1	London
		*February 1894	Wyllie 1891-1894		Edinburgh
		17 March 1894	Küchler 1894	1	Germany
20 March 1894	Pathological Society of London	24 March 1894	Ord & Shattock 1894	1	London
		*March 1894	Wyllie 1891-1894		Edinburgh
		28 April 1894	Tomkins 1894	1	Brighton
		*April 1894	Wyllie 1891-1894		Edinburgh
		*May 1894	Wyllie 1891-1894		Edinburgh
25-29 October 1894	Congrès français de médecine interne, Bordeaux	10 November 1894	Dupré 1894	2	Bordeaux
		3 November 1894	Stembo 1894	2	St.Petersburg
		1894	Wyllie 1894	(See 1891-1894)	Edinburgh
		22 June 1895	Rev Wyllie 1894		

NOTES

(1) The identity of Michael Ryan (and therefore the source of the paper) is not certain. At the head of the paper, Ryan's qualifications are given as MD (Edinb.), MRCS (London) and Lic.RCS (Edinb.). He could, then, have been the Michael Ryan who received his MD from Edinburgh in 1784 and who practised medicine in Kilkenny and Edinburgh before entering the Colonial Service (see second entry under Michael Ryan in INBc:1833). On the other hand, he could equally well have been the Michael Ryan (c.1793-c.1840) who graduated from Edinburgh and later edited the London Medical & Surgical Journal (see Prov.Med.Surg.J. i, 1840, 207-208).

(2) It is probable that 'F.Basset' refers to F.John Basset of Brixton and not N[icholas] Francis Bassett of Truro - both names appear in the List of the Members of the Royal College of Surgeons, London, 1825:11. The article contains a reference to a 'Dr. Babington' - very probably G.Gibborne Babington of Golden-square, London - and this would suggest that Basset of Brixton was the author. (I am grateful to Mr. Robin Price, Deputy Librarian of the Wellcome Institute for the History of Medicine, for his assistance in ascertaining the existence and career of F. John Basset ; details of N.F. Bassett appear in the London and Provincial Medical Directory up until 1868 - see, for example, 1868:287).

(3) Bateman (1868b:62-63) refers to a case of aphasia, taken 'from the notes of the late Mr. Norgate' by Dr. Copeman, and 'lately communicated to the Norwich Pathological Society' (see also Bateman 1890:60). Copeman contributed a number of papers to the Norwich Pathological Society - after 1867 it amalgamated with the Norfolk and Norwich United Medical Book Society to form the Norwich Medico-Chirurgical Society - but none of them has to do with aphasia. Furthermore, there is no reference to any such paper in other works by Copeman from this period (Copeman 1873). (I am grateful to Dr. A.Batty Shaw, Physician and Archivist of the Norfolk and Norwich Hospital, and to Dr. P.W.M. Copeman of the Westminster Hospital, London, for their help in establishing the above facts.)

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APPENDIX B

BROCA'S STUDIES IN LINGUISTICS

B.1 Broca's interest in linguistic matters appears to date back no further than 1860, to the time when he was 36, a professor of surgery at the Paris Medical School and a well-known figure in medical and anthropological circles in France. At a meeting of the Société d'Anthropologie that year, he discussed the question of whether the languages of Polynesia could have had a common ancestor.(1) He concluded that neither the purely linguistic criterion of lexical resemblances nor certain physical anthropological and cultural criteria showed that such a common ancestry was likely.

His use of linguistic evidence alongside that from other disciplines typified his whole approach to the study of 'normal' languages, as distinct from that of pathological forms of language. Thus, he accepted unreservedly that 'la linguistique est une des gloires de notre siècle' on account of the progress it had achieved not only in unravelling the histories of individual languages but of developing a theory of language change. However, he had to admit, as an anthropologist, that the value of linguistics lay in its being a witness to, not a judge of, matters relating to the history of earlier peoples.(2)

B.2 His interest in the Basque language derived from his study of the physical characteristics of the Basque people - in 1862 he had published a paper on the physical anthropology of Basque skulls -(3) and appears to have had little, if anything, to do with an interest in the language per se. In fact, some thirteen years after starting

work on Basque anthropology, he confessed that he was unfamiliar with the language![4] And so, in this long paper on the origins of Basque and of the Basque people, he concentrates almost exclusively on those theoretical questions raised by attempts to reconstruct the linguistic forms and cultural habits of the Basques over the centuries. He criticises in particular the line of argument put forward by Wilhelm von Humboldt, one of the 19th century's avid students of the language and its culture. The nearest he ever came to investigating the language itself was when he instituted a study of the geographical extent of the Basque-speaking areas of France and Spain.[5] A similar, but by no means so exhaustive, enquiry into the state of the Breton language in France is mentioned briefly in Broca 1879.

B.3 Broca referred only once to a topic within theoretical, as distinct from descriptive, linguistics. In the course of his paper on linguistics and anthropology (1862), he used the term 'faculte du langage articulé' which, he says, is manifested by 'le langage'. He made no attempt to elaborate on either of these terms, but as noticed in Chapter 3, he had already, in 1861, started to use them in discussions of cases of "aphasia", so no particular importance need be attached to them in the context of the 1862 paper. The source of the term 'faculté du langage articulé' is not known. It is not in, for example, Nodier 1837.[6]

NOTES TO APPENDIX B

(1) Broca 1860.

(2) 1862 (1888:I,276).

(3) Pozzi 1880:606.

(4) Broca 1875a:16.

(5) In 1864 he presented to the Société d'Anthropologie a manuscript map of the Basque territory of France, based on work carried out by two colleagues in South-West France (Broca 1864f). The map, with the addition of information gained from field-work studies by other colleagues in Spain, was first published in 1868 (Broca 1868a) and later reprinted in Broca 1875a.

(6) It is not discussed by Kukenheim (1962).

NOTES FOR APPENDIX C ARE BETWEEN
PAGES 563 AND 567

APPENDIX C

THE LINGUISTIC ASSESSMENT AND THE TREATMENT OF APHASIA

C.1 Assessments

On only a relatively few occasions in the literature is there any mention of aphasics being tested: mainly, it would seem without the use of any specific, standardized forms of assessment.(1) As far as one can judge, the individual clinician based his estimate of the severity of the aphasia only on what he observed the patient could or could not do. The use of anything approaching a more formalized assessment procedure appears to have been very much the exception rather than the rule.

Of the cases in which a more systematic investigation was undertaken into the extent of the linguistic deficits, those by Osborne (1834), Scoresby-Jackson (1867a), Bristowe (1871b), Dingley (1886) and Beevor (1893) deserve closer attention.

C.1.1 Osborne assessed a variety of functions, including speech-comprehension, word- and sentence-repetition, by means of simple tests of his own devising.(2)

Scoresby-Jackson used a paragraph from Osborne's paper of 1834 with which to test his patient's ability to write, but in addition devised a fairly extensive series of tests of his own. With these, over a period of days, he analysed the actual form of the patient's defects: for example, could he understand questions, could he write numerals, could he say the letters of the alphabet, could he tell the time, could he answer general knowledge questions, etc.?(3)

Bristowe's method of assessment (probably of his own devising) covered five modalities: speech, writing, reading, speech-comprehension and numerical processes. Within each modality, he examined particular sub-types of behaviour: spontaneous speech (the repetition of words and sentences, the repetition from memory of the Lord's Prayer, and the naming of particular objects in the patient's immediate environment); spontaneous writing (the writing of names, the copying of a printed passage and the writing of figures to dictation); and reading (the reading of print, of capital roman letters, etc.). He assessed speech-comprehension by judging the aphasic's reactions in the context of the communicative situation. Numerical processes were tested by asking, for example, how many pence there were in a shilling, and by asking the patient to perform elementary arithmetical calculations.(4) A significant absence, however, from Bristowe's range of tests is anything that would have allowed him to determine the aphasic's ability to understand written material that he had read.

A form of assessment based on Bastian's theory of word-centres (pp.325-330 of this thesis) was used by two clinicians. Dingley and Beevor both based their tests (Beevor's apparently in ignorance of Dingley's) on the premise that either an actual 'word-centre' might have been damaged or a commissure between two of them. Thus, a test designed to assess the preservation or disturbance of the auditory word-centre would assess the patient's hearing, his ability to understand 'everything that is said to him readily and well', and his ability to speak spontaneously, from memory and in imitation of another person.(5)

For an assessment of the integrity or otherwise of the visual word-centre, the patient's sight would be tested, also his ability to comprehend printed and written words, his recognition of common objects, and his ability to write not only spontaneously, but also from memory and in imitation. The capacity to read aloud obviously tests two centres, the visual and the auditory, and this function together with the ability to write from dictation were therefore examined.(6) What was achieved was information concerning not only specific semiotic functions but also certain implications as to the site of the lesion or lesions causing the disturbance. Thus, Beevor, by asking his patient to 'name letters or objects seen, or objects heard, felt, smelt, or tasted' was, according to Bastian's theory, testing the 'visual-auditory-tactile-gustatory-speech commissure'.(7) With a different sub-test result it was possible (and for Beevor this was obviously a matter of implicit faith in the theory - or what Head later described as an example of 'serene dogmatism') to conclude that the cause of the particular aphasic defect was a 'meningeal haemorrhage or simple concussion' probably over the 'visual word-centre in the supramarginal and angular gyri'. On the basis of conclusions such as these, a decision might then be taken to operate on a particular area of the brain.(8)

C.2 Treatment

Three different forms of treatment of aphasia can be distinguished: surgical, medical and linguistic.

C.2.1 A case was reported by Winslow(9) of a young sailor, who had been wounded in the head by a gun-shot; he suffered thereafter from an

epileptic fit and the loss of speech. Trephining was carried out to evacuate the cranium of foreign matter, and this had the unexpected and salutary effect of leading to a recovery in his speech.(10) A case reported by Ball was one in which the trephining was believed to have been the reason why the patient made a complete recovery from the aphasia.(11)

C.2.2 Medical forms of treatment were of three types. Blood-letting was prescribed on occasions as a means of assisting the recovery of speech.(12) Secondly, a combination of medication and minor surgery was also tried. Charles Bell, who had been asked by a colleague for advice on the most appropriate form of treatment for an elderly lady who suffered from gout and who, in addition, experienced 'difficulty in using her tongue, and in expressing particular words' such that eventually she 'lost her speech altogether', prescribed 'nauseating medicines, leeches under the mastoid processes, and a seton across the neck near the occiput'.(13) What effect all this had we are not told! In another case, treated directly by Bell himself, the patient was 'purged with scammony and calomel' and bled 'from the haemorrhoidal vessels'; also, 'cold lotions [were] applied to the head'.(14) Thirdly, chemo-therapy as a means of treating aphasia came into greater use, especially from the mid 1860s onwards: doubtless because, with the rapid increase in interest in aphasia as a clinical syndrome, doctors were compelled to ask themselves how the condition might be alleviated. Corresponding to this, one finds less frequent use of setons and blood-letting as forms of treatment.

A common prescription was potassium iodide;(15) arsenic, iodine and mercury also being in use. However, as far as one can judge from

the descriptions in the case-reports, a drug was never prescribed solely to treat the aphasia. Instead, any improvement in the aphasia was a side-effect of the basic treatment: in most cases for apoplexy. An examination of the different drugs that were used shows that they had all proved their worth in handling different aspects of the apoplectic state: for example, pulmonary congestion and hypostatic pneumonia, retention of urine and stoppage of the bowels, restlessness, general debility, depression, and so on. Thus, iodides were known to be of value in combating congestion and pneumonia;(16) jalap, scammony, mercury, rhubarb and calomel acted as purgatives;(17) valerian and bromide of potash were used as sedatives;(18) strychnine, quinine, hypophosphate of soda, iodide or iron and cod liver oil had long proved their usefulness as general tonics;(19) and digitalis, arsenic, iodide and calomel were used as means of alleviating some of the root causes of apoplexy: digitalis was a cardiac stimulant,(20) and the other three drugs were used, with varying degrees of success, in the treatment of syphilis.(21)

In this sense, then, there was no such thing as a specifically medical form of treatment for aphasia: any improvement came about as the result of the use of chemo-therapy for the underlying physical conditions which were, in part, responsible for the aphasia in the first place.

A generalised, less specific form of medical treatment, involving attention to a sound diet, was recommended by a number of clinicians - but again, in the context of treating the underlying physical condition, not the aphasia in particular.(22) Bran or mustard poultices and

etherised draughts[23] were used for the same reasons.

Electrical treatment, both faradic and galvanic, was used occasionally; or it was suggested that it should be so used.[24]

C.2.3

C.2.3.1 In the 19th century, the provision of speech therapy for aphasics was dependent entirely on the inclinations and abilities of individual people, mainly doctors; there was nothing remotely approaching the concept of an organised speech therapy service. In fact, it has even been estimated that in the early 1800s there were perhaps no more than 'half a dozen specialists concerned with remedial speech training' at work in the British Isles.[25] During the course of the century, however, many more people emerged as 'speech therapists': these included doctors, dentists, orators, actors, orthoepists, clergymen and singing teachers.[26] It was not, however, until 1911 that the first hospital speech therapy clinic was set up at St. Bartholomew's Hospital in London under Cortlandt MacMahon, although aphasics were probably not treated there.[27, 28]

C.2.3.2 Despite the lack of any formal provision of speech therapy, there is sufficient evidence to show that at least some aphasics were being treated, mainly in hospitals, both on the Continent and in the British Isles. Examples are quoted in the literature from Paris, Berlin and Strassburg.[29] In the British Isles, a number of individuals were working as speech therapists.[30] The earliest example of speech therapy for "aphasia" during the 19th century would seem to have been a case reported by John Broster, a doctor who specialized in the treatment of stammering.[31] Broster claimed to have cured Dugald Stewart,

Professor of Philosophy at Edinburgh University, of a stroke, such that he was able to read aloud 'before company', although the 'paralytic affection had almost deprived [him] of the power of speech'.(32) However, Broster's claim may not be as convincing as it sounds. According to James Hunt, Stewart had indeed suffered a stroke, but Broster had first treated him 'when ... nearly all the symptoms of paralysis had already disappeared, and Dugald Stewart had comparatively recovered'.(33)

The first incontrovertible case of speech therapy for "aphasia" would seem, then, to have taken place a few years later. Jonathan Osborne(34) described how, after prescribing certain medicines to help improve the physical condition of his patient,(35) he had commenced speech therapy with him: 'I advised him to commence learning to speak like a child, repeating first the letters of the alphabet, and subsequently words, after another person. This was a very laborious occupation ... The result, however, has been most satisfactory, and affords the highest encouragement to those who labour under this peculiar kind of deprivation ... if his health is spared, and his perseverance continues ... he will obtain a perfect recovery of speech'.(36)

From the 1860s onwards, one finds further evidence of speech therapy being given to aphasics, in different parts of the British Isles.(37) It seems unlikely, however, that clinics in only those towns and cities listed were able to provide some form of speech therapy. One must assume that in other places, especially Edinburgh and Dublin with their flourishing medical schools and hospitals, speech

therapy must have been provided in some form.

C.2.3.3 As far as one can tell from the sometimes limited remarks on the form of therapy that was given, it would seem that in the majority of cases it was doctors who actually worked with the patients, people like, for example, Russell, Gairdner, Finlayson, Wilks, Bristowe, Ross and Suckling. However, in three cases, nurses on the ward acted as therapists.(38) Other hospital patients were also known to have done the same.(39) Gairdner found that the relatives of one of his aphasics were able to 'devote themselves to the systematic education of the dormant faculty for the last two years'.(40) From remarks made by Suckling and Reynolds about 'the teacher' and 'the operator',(41) it is possible that other personnel were carrying out the actual therapy.

Indeed, looking at the literature on speech disorders at the beginning of the 20th century, one finds further examples of hospital staff, other than doctors, carrying out the work.(42)

C.2.3.4 Opinions varied, however, as to how the aphasia therapy should be structured. There were those who believed that the patient should be treated as though he or she were a young child learning speech for the first time: that is, the aphasic should be taken through the normal stages of linguistic development.(43) One clinician, however, preferred to teach the aphasic by the same principles and techniques that were used with deaf-mutes.(44) Wilks said that his aphasic patient was taught 'as a person learning a foreign language'.(45) The great majority of clinicians, however, devised their own procedures, which, in the main, consisted of little more than getting the patient to say

the letters of the alphabet or count up to twenty.(46) A Glasgow physician, James Finlayson, was more adventurous. He had his patient spell words by means of 'letters on movable tablets', arrange numbers in sequence, match colours to spoken words, copy writing (including Greek), write to dictation, read aloud written words, and sing.(47)

C.2.3.5 An area on which there was little agreement concerned the initial stages of therapy. Kussmaul, from his experiences in Strassburg, recommended that only words in common use should be used,(48) and that the actual material should be graded: first of all, individual 'letters' should be articulated, followed gradually by whole syllables and words until eventually complete sentences could be produced. The emphasis, in any case, was on stimulating the aphasic's phonology; nothing was said about equivalent exercises for grammar. James Ross, the Manchester physician, followed a similar line of argument as Kussmaul, except that, in his opinion, 'explosive consonants' should be 'taught' before any attempts were made to teach particular syllables, namely the letters of the alphabet;(49) we are not told the reason for the emphasis on this particular class of consonants. His colleague, Ernest Reynolds, however, preferred to start with vowel-sounds before the patient was led on to the 'labial, dental, linguals [sic!] and guttural consonants'.(50) In Edinburgh, John Wyllie taught one of his patients the 'Physiological Alphabet' (devised by Wyllie), then took him through 'letter-sounds' until whole words were built up.(51)

C.2.3.6 An interesting feature of 19th century practice concerned the duration and frequency of the therapy sessions. Gowers, for example, favoured the principle of the therapy being given 'several

times a day'.[52] Kussmaul, although not necessarily agreeing with the idea of several sessions per day, nevertheless found that in cases of amnesic aphasia, daily practice at 're-learning' words was essential, and that the aphasic should, where appropriate, 're-acquire the words from a dictionary'.[53]

C.2.3.7 The rationale behind the therapy was very much based on practical considerations:experience showed that speech therapy did produce results. But what, in neurological terms, was taking place? There were essentially three points of view, all closely allied to one another. It was believed that 'the nervous centres [were being] re-educat[ed]'[54] or, put another way, that the 're-development of the faculty of language' was taking place.[55] Secondly, that the right hemisphere was taking over the functions formerly located in the left.[56] And thirdly, without being specific as to where in the brain the functions were being re-deployed, that 'compensatory acquirement ... by cerebral centres other than those chiefly and usually concerned with speech' was taking place, with, in addition, 'raising' of 'the functional capacity of a partly damaged speech-centre'.[57]

C.2.3.8 The focus of attention in the speech therapy was clearly on the restoration of speaking: little was said, either in general or in particular, about how the other modalities might be brought back into action. As a form of treatment for agraphia, all that was suggested was that the patient should learn to write to dictation,[58] to use a 'type-writer',[59] to trace the outline of the individual letters first with the finger before attempting to write,[60] to 'print with the left hand',[61] or, lastly, to copy letters, syllables and simple words'.[62] In cases of a disturbance of speech-comprehension (word-

deafness) the only recommendation was that 'simple directions must be uttered to the patient, and gradually varied and made more complex'.(63) For treating dyslexia, the patient might find it useful to work with 'raised letters',(64) or be taught to read 'like a child',(65) or be taught 'to recognize printed letters'.(66) In cases of continued word-blindness and word-deafness, the patient, according to one clinician, could be deemed to be 'ineducable'.(67)

C.2.3.9 A central question in any proposed treatment of aphasia must be its chances of success. The only reservation that was expressed in the literature was by Trousseau, who admitted that in cases of aphasia with hemiplegia, 'we are almost completely powerless. We can no more cure the Aphasia than we can the paralysis which accompanies it. Nature alone, or nearly alone, brings an improvement, which is in all cases merely partial'.(68) Pershing and Bastian, by omitting any mention of treatment from their books on aphasia,(69) were also perhaps expressing a degree of scepticism about the efficacy of speech therapy in such cases. However, against this must be set the experience of other clinicians, who indicated that some improvement - if not, in certain cases, total recovery - could be achieved by speech therapy. Bateman, for example, referring to the success that Osborne had had in the treatment of his aphasic patient, was confident that 'However hypothetical ... the re-education of the nervous centres may, at first sight, appear', an endeavour should be made 'to rouse into action the complex apparatus'.(70) Kussmaul believed, in principle, in speech therapy for aphasics: a 'methodical course of instruction in speaking [is] very valuable'.(71) And ten years later, Gowers was to sum up the view of many clinicians (as expressed in the case-reports) in these

words: 'Great patience and perseverance are required, but these will be rewarded by progress far more rapid than is possible if the patient is left alone'.(72)

C.2.3.10 Lastly, the case of speech therapy described by John Bristowe deserves closer consideration, since together with that by Osborne,(73) it constitutes the best full-length description of speech therapy for aphasia in the whole of the 19th century literature.(74) Bristowe's patient was a Canadian speaker of English, aged 36, who in consequence of epileptic fits, had become aphemic: that is, in Bastian's sense of the word, he could read, write, and understand but could not utter a sound. He had remained in this condition for nine months before coming under the care of Bristowe. Various physical remedies had been tried - all to no avail. It was as a direct result of 'instruction' from Bristowe, plus 'zealous practice' by the patient, the help of the ward sister, nurses and three or four 'intelligent patients' in the hospital, that rapid progress was made and the man soon made a 'perfect recovery'. In Bristowe's estimation, the patient had 'probably ... forgotten how to combine automatically the movements of [the] organs [of articulation] so as to obtain from them the elementary sounds which in combination constitute articulate speech'.(75)

The 'treatment' was therefore directed exclusively at re-activating the articulatory mechanisms - nothing was done, for example, about introducing particular items of vocabulary to him; the aim was to work solely at the phonological level. Over a fortnight, the patient was given four or five 'lessons' lasting about ten minutes each. Initially, he was taught to phonate, then to phonate with a superimposed vowel

articulation. In time, he was able to produce 'elementary articulate sounds', together with sequences of vowels and consonants. Bristowe described the therapy thus:-

> I explained to him my view of his case, which he appeared perfectly to understand: and I began with my first lesson, which lasted five or ten minutes only. I showed him that ordinary vocal sounds are compounded of two factors, namely laryngeal intonation (which he was already capable of producing, and articulation effected by means of the lips, tongue, and associated parts (which he was as yet totally incapable of producing). I got him then first to sound a laryngeal note: and subsequently, by explaining to him, and showing him, how to modify the shape and size of his oral passage and aperture, and getting him at the same time to expire either with or without laryngeal intonation, made him sound successively both in a whisper and in a loud voice several of the simple and more common vowel-sounds - a in gate, a in art, a in all, e in feel, oo in root, o in hole, and that which is sometimes called 'ur vocal' - the vowel-sound in the first and last syllables of the adjective 'earlier'. I do not mean to say that he learnt at once to articulate these letters accurately: but he so far succeeded that those about him easily identified his attempts at pronouncing them: and he himself fully recognised his success. At my next visit, three or four days afterwards, I found that he had by practice completely mastered the sounds which I had taught him, and I set to work to teach him the labials, p,b,f,v, and m. I may as well, perhaps, explain minutely, in reference

to these letters, the method of instruction which I pursued. I closed my lips firmly and then opened them with a sudden smack, and got him to do the same. We both thus pronounced the essential sound of p. I asked him if he did not recognise it, and I made him repeat the process until he recognised it fully. I then explained to him that in order to make the sound perfectly clear, it was essential that a vowel-sound should be prefixed or appended to it. And I got him to follow up the sound of p, as above produced, by a vocalised e. In his first efforts the two sounds were uttered at a considerable interval one after the other, but gradually he approximated them until he succeeded in making them very nearly continuous. There remained, however, even at the end of the lesson a slight but quite appreciable fault. Then, closing my lips as before, I produced laryngeal intonation without allowing air to escape through my nose, and whilst producing this sound in my throat opened my lips. I made him perform the same acts, and recognise that he had thus, almost without knowing it, articulated the letter b. Next, still setting him the example, I made him place his upper teeth upon his lower lip, and blow between them without associating therewith any laryngeal sound: he uttered the sound of f, and perceived clearly that he had done so. Then, by repeating exactly these actions, with the exception that he was now made to utter a musical note during the period of expiration, he sounded and recognised that he had sounded the letter v. Finally, I got him to close his lips, and without opening them again to make a continuous laryngeal

sound - in other words to allow the air passing between his vocal cords to escape by the nose; the essential sound of m was the result. I need scarcely add that, not only in the first, but in every other case, as soon as I had made him recognise that he had really articulated the letter-sound which I was teaching him, I then endeavoured to make him associate its pronunciation with that of some prefixed or appended vowel, and in every case with considerable though not absolute success.

At subsequent visits I taught him by the same process (I need not go further into the details) the lingual and guttural consonantal sounds. And thus in the course of four or five lessons, each of about ten minutes' duration, given within less than a fortnight, he acquired the power of articulating all the simple vowel-sounds and all the simple consonant-sounds, including those of th in 'thing', and th in 'this', ng in 'tongue', sh, and z in 'azure'.

On December 4, he wrote on his slate, 'I don't feel very well this morning. I got a fall last Thursday night (accidentally), one of my crutches slipped, which gave me a severe shaking. My back is rather painful, and a great deal of pain in the head from the fall. Can pronounce all the vowels except i and u. Can't pronounce g, h, j, q, w and y'. The truth, however, was, as is stated above, that he could pronounce all the elementary articulate sounds, but he could not yet combine sounds which he had not been taught to combine, and he could not therefore utter the English names

of the letters which he here enumerated. It is scarcely necessary for me to point out that i and u represent compound vowel-sounds, and that each one of the other letters which follow is made up of at least three distinct literal sounds.

At the end of a fortnight from the beginning of my treatment I began to teach him to combine letters. Selecting certain consonants I made him pronounce them in conjunction with the various vowel-sounds. I found little difficulty now in making him do this: and I recommended him to practise new combinations for himself, for which purpose I suggested that a child's spelling-book might be useful to him: and he got one. I think it was at my next visit, three or four days afterwards, that he greeted me for the first time with a somewhat slowly and carefully uttered 'Good morning, Sir'. His progress was now marvellous in its rapidity. Within another ten days he was able to talk well, except that perhaps he spoke somewhat slowly, and evidently had to give more care and thought to the pronunciation of his words than healthy people need to do. He improved subsequently in readiness of speech, but even when he left the hospital spoke perhaps a little slowly and carefully. This manner may, however, have been natural to him. It may be worth while to add that when his speech was restored he spoke with his original American accent.(76)

NOTES TO APPENDIX C

(1) In addition to the studies detailed below, see Wilson, T.S. 1889:207; Glynn 1890:168; Fraser, D. 1893:84.

(2) Osborne 1834:161-162, 168-169.

(3) Scoresby-Jackson 1867a:585-593.

(4) Bristowe 1871b:224-226.

(5) Dingley 1886:497-500.

(6) Dingley: loc.cit.

(7) Beevor 1893:275.

(8) See also sub-section 4.8.11.4.

(9) Winslow 1860:521-525, quoting from a case first described by the French clinician Lalluyeaux.

(10) Pott had recounted a similar instance of the effect that trephining had on the recovery of speech (Pott 1775:169-170). See also O'Halloran 1793:285.

(11) Ball, C.B. 1888:749.

(12) Powell 1815:217; Cross 1816:122; Roscoe 1869:199.

(13) Bell, C. 1827:84-86; 1836:390, 391.

(14) Bell, C. 1836:395.

(15) See, for example, Jackson, J.H. 1864h:461; Roscoe 1869:199; Bristowe 1870a:98; Curran 1873:112; Martin 1873:299; Broadbent, W.H. 1875: 402-403; S. 1885:728; Mantle 1893:948.

(16) Bartholow 1876:165. See: Martin 1873:299; Broadbent, W.H. 1875: 402-403; Mantle 1893:948.

(17) Bartholow 1876:442, 443, 177, 438, 181. See: Martin: loc.cit.; S. 1885:728.

(18) Bartholow 1876:301-302, 365. See: Sansom 1894:543 (BMJ), 269 (Cl.Soc.); S. 1885:728.

(19) Bartholow 1876:255, 128, 165. See: Copland, J. 1883:896; Bristowe 1870a:98; Broadbent, W.H. 1875:403.

(20) Bartholow 1876:271. See: Copland, J. 1887:896.

(21) Bartholow 1876:110, 169, 181. See: Sansom 1894: loc.cit.; Jackson, J.H. 1864h: 461; Roscoe 1869:199; S. 1885: loc.cit. If the arsenic had been of the inorganic variety, it would not have been of benefit, however.

(22) Glover 1872:57; Dale 1878:454; Brown, W.H. 1880:851; Daly 1887:233.

(23) Courties 1865:268; Bristowe 1870a:98; Jacob 1890a:428; Jacob 1890b:623.

(24) Marcet, W.M. 1869:115; Brown-Séquard 1877:223.

(25) Rockey 1980:48.

(26) Rockey: loc.cit. At the same time a number of works on 'impediments of speech' were published. The majority dealt, despite their titles, which suggested a comprehensive view of the subject, with stammering (Cull 1833; Hartley 1833; Wright, J. 1835, 1839; Ashburner 1843; Bell, A. 1849; Bishop, J.B. 1851; Hunt 1854, 1859; Gray 1862; Foster, J.E. [1885]; Sandlands 1886; Ball, J.C. 1890; Abbots 1894). Furthermore, the lecture on speech pathologies, given at St. George's Hospital, London, by J.W. Haward in 1887, may well have been the first of its kind to a medical audience; it undoubtedly reflected a growing interest amongst doctors in the subject of speech pathology in general. Details of the form of speech therapy given by doctors in three childhood cases of 'unintelligible speech' were recounted at medical society meetings (Hadden, 1891, 1893; Taylor, F. 1890-1891; White, H. and Golding-Bird 1891). The case described by White and Golding-Bird was probably the first in which a phonograph was used to record the patient's speech.

(27) Eldridge 1968:60 states that it is not certain what sort of cases he dealt with. However, from the evidence of one of his papers (MacMahon, N.C.M. 1928) it seems that, certainly during the period of the First World War, he was treating mainly voice disorders. I can find no evidence that he treated aphasics.

(28) In 1906 the need for an organised system of speech therapy was officially recognized with the setting up of special clinics for school-children in Manchester and Glasgow. In both cases, the only form of speech disorder that was treated was stammering (Sykes 1962:7). In other countries, especially in Germany, speech therapy clinics had been established much earlier than in the British Isles, but they too provided for children not adults (Heindorf 1973; Eldridge 1968; van Thal 1929; Voigt 1954). Oźtuszewski, however, treated adults, including aphasics, in Warsaw (Oźtuszewski 1903; see also Chapter 2, note (35).

(29) Broca 1865a:95, 98; Dupuy 1877:358; Küchler 1894:42; Kussmaul 1878:632-633, 804-805.

(30) The terms 'speech therapy' and 'speech therapist' are used here for convenience: they are of relatively recent origin, having come into routine use as late as the 1930s (Wilkins, J.T. 1952: 417). Before then, speech therapy had been known variously as 'education' or 'oral instruction'; the therapist was the 'instructor in voice production', 'vocal therapist', 'speech correctionist', 'instructor in vocal therapy', 'remedial teacher of speech', 'curative speech trainer', 'stammering instructor' or 'remedial speech trainer' (Wilkins, J.T. loc.cit.; Sykes 1962:10; Eldridge 1968:60).

(31) Cf. Rockey 1980:166.

(32) Broster 1826:7.

(33) Hunt 1870:68-69.

(34) See above sub-section 2.3.4.

(35) It is noteworthy that John Abercrombie, possibly the clinician with the widest experience of handling cases of "aphasia" in the first forty years of the century, never once suggested anything other than medication for the treatment of the condition.

(36) Osborne 1834:169.

(37) Birmingham: Russell, J. 1864b:408; Suckling 1888:619, 1890:18-20.

Cork: Cremen 1886:14-15.

Galway: Cleland 1870:185.

Glasgow: Gairdner 1865-1868:93; Gairdner et al. 1875:568; Finlayson 1876a:459, 1876b:362.

Huddersfield: Bevan 1890:53.

Leeds: Allbutt 1869:492.

London: Ramskill 1862:680; Bristowe 1870a:95-98; Wilks 1872:146-147; Bastian 1882a:71; Staubback and de Watteville 1886: 753; Turner, G.R. 1887:117; Gowers 1888:415-416, 1893: 449; Roberts, F.T. 1888:866; Cautley 1889:267; Beevor 1890:61.

Manchester: Ross 1886a:273-274; Reynolds 1893:100.

Norwich: Bateman 1869b:119.

(38) Ramskill 1862:680; Cleland 1870:185; Bristowe 1870a:94 (see also below sub-section C.2.3.10).

(39) Allbutt 1869:492; Bristowe 1870a:94.

(40) Gairdner 1865-1868:93.

(41) Suckling 1890:18-20; Reynolds 1893:100.

(42) Fagge and Pye-Smith 1901:743 note that a ward sister and two clinical clerks were entrusted with the job of giving speech therapy to an aphasic.

(43) Wilks 1872:146; Turner, G.R. 1887:177; Bevan 1890:53; Beevor 1890:61; Bramwell, B. 1899:304; Colman 1901:774; Collier, J. 1912:1147.

(44) Roberts, F.T. 1888:866. See also the comment in Haward 1887:111 about a teacher of deaf-mutes treating a case of cleft palate.

(45) Wilks 1872:146.

(46) Russell 1864b:408; Allbutt 1869:492; Cleland 1870:185; Wilks 1872:146-147; Ross 1886a:273-274.

(47) Finlayson 1876b:354-356 (= 1876a:459).

(48) Kussmaul 1878:805. Cf. also Gowers 1888:415, 1893:449.

(49) Ross 1886a:274.

(50) Reynolds, E.S. 1893: 100.

(51) Wyllie 1894:325-326.

(52) Gowers 1888:415, 1893:449. See also Collier 1912:1147.

(53) Kussmaul 1878:805.

(54) Bateman 1869b:118.

(55) Rosse 1888:291.

(56) Broca 1865a:95; Gowers 1888:415, 1893:449; Cautley 1889:267; Bramwell, B. 1899:304.

(57) Collier 1912:1143.

(58) Finlayson 1876b:354 (= 1876a).

(59) Gowers 1888:415-416.

(60) Suckling 1890:19-20.

(61) Fagge and Pye-Smith 1901:743.

(62) Collier 1912:1148.

(63) Gowers 1888:415.

(64) Suckling 1890:19.

(65) Colman 1901:774.

(66) Fagge and Pye-Smith 1901:743.

(67) Collier 1912:1148.

(68) Trousseau 1866:274.

(69) Pershing 1897; Bastian 1898. But see Bastian 1882a:71.

(70) Bateman 1869b:119.

(71) Kussmaul 1878:804.

(72) Gowers 1888:415, 1893:449. There are a number of cases in which success was claimed in the treatment of the aphasia by means of speechtherapy: Bateman 1869b:119; Allbutt 1869:492; Bristowe 1870a; Wilks 1872; Gairdner et al. 1875:568; Jackson, J.H. 1878:80, 1878-1879:171; Bastian 1882a:71; Ross 1886a:273-274; Staubback and de Watteville 1886:753; Cremen 1886:15; Turner, G.R. 1887:117; Suckling 1888:619; Beevor 1890:61; Suckling 1890:18-20; Küchler 1894:42; Fagge and Pye-Smith 1901:743. Expressions of 'faith' in the value of speech therapy can be found in the review of Hammond (1871) Med.T.& Gaz. i, 1871:360; Dupuy 1877:358; Cautley 1889:267; Rosse 1888:291; Bevan 1890: 53; Reynolds, E.S. 1893:100; Gowers 1893:449; Colman 1901:774; Bramwell, B. 1899:303-304; Monro 1911:751; Collier 1912:1143.

(73) Osborne 1834. See above, sub-section C.2.3.2.

(74) Bristowe 1870a.

(75) Op.cit.:94-95.

(76) Op.cit.:95-97.

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